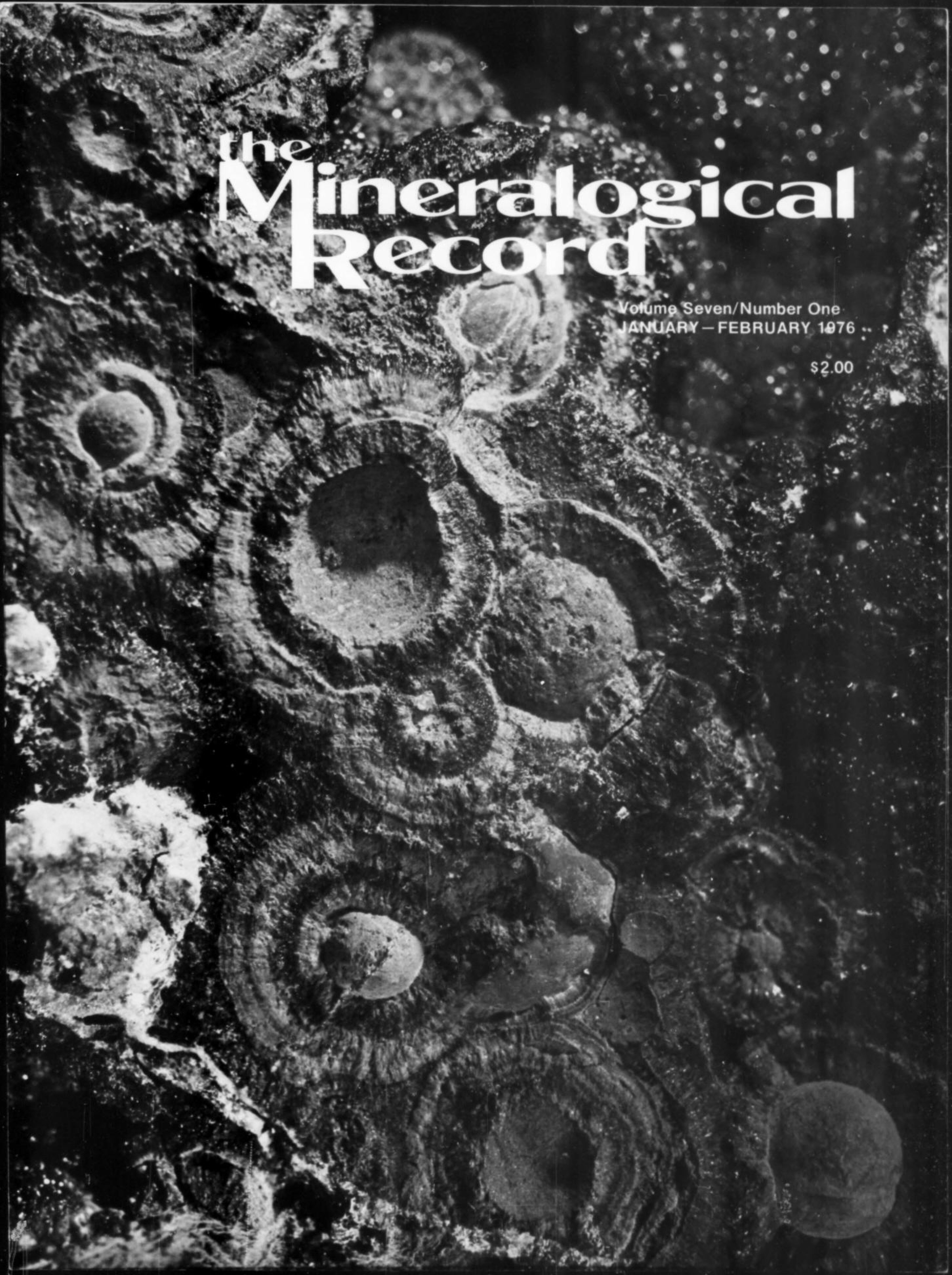

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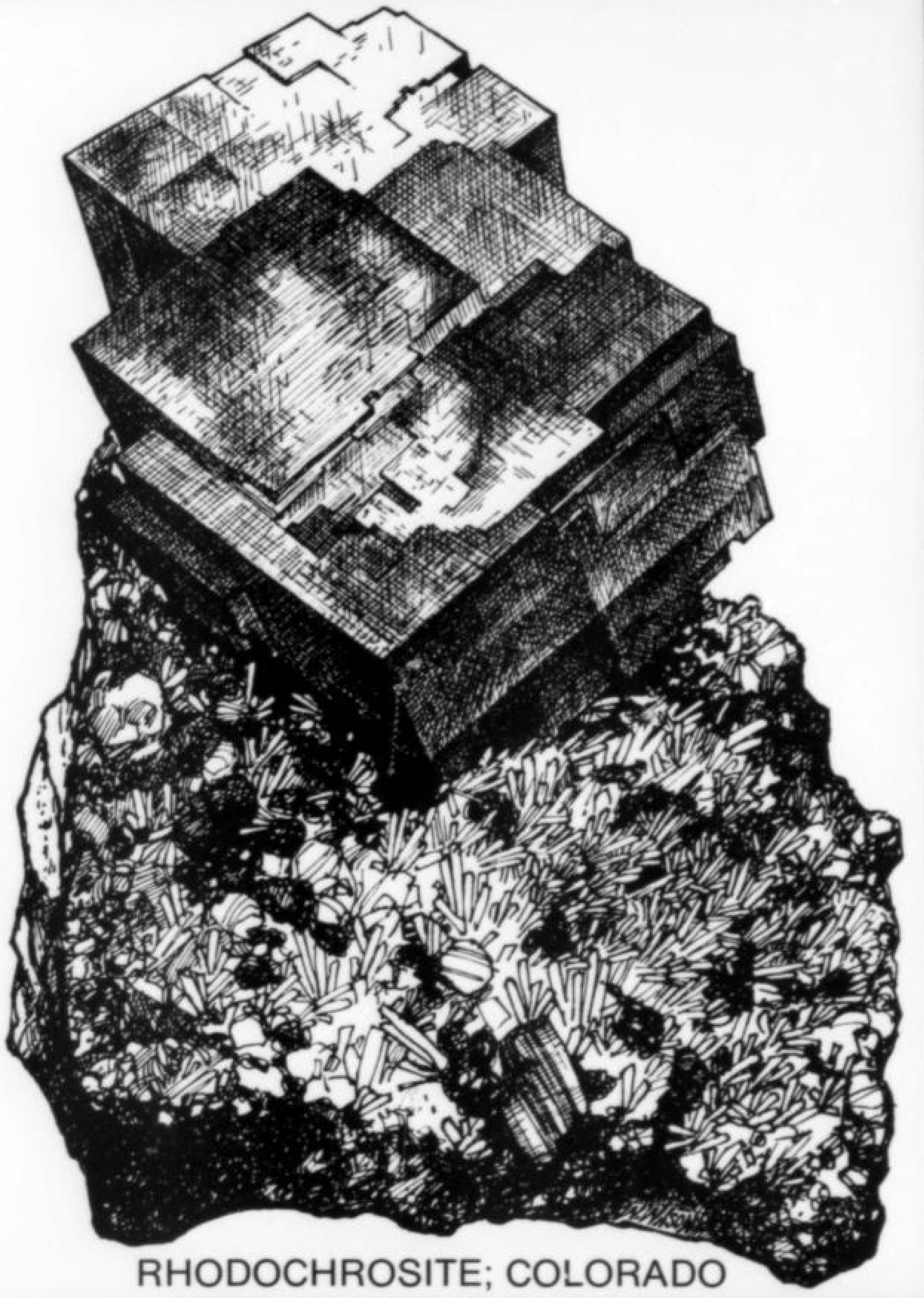

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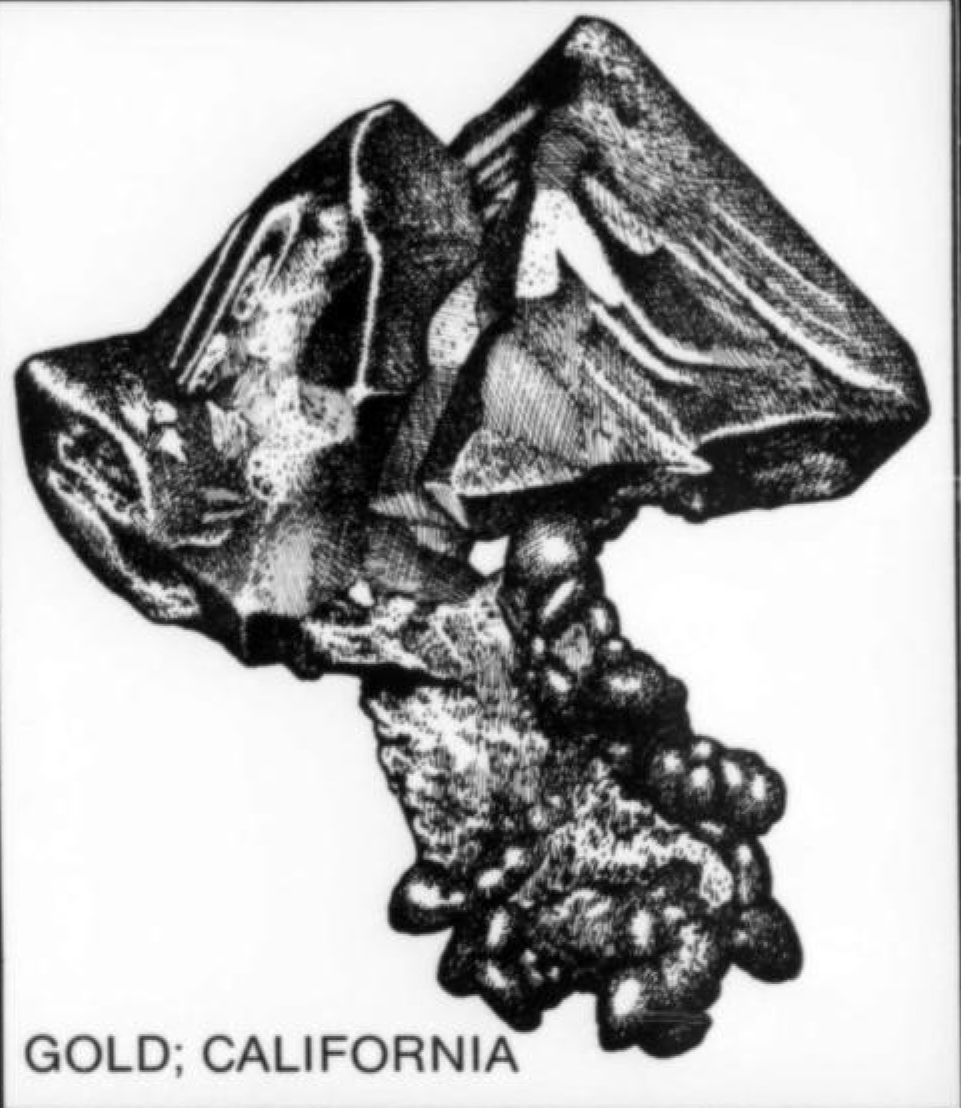

GOLD; CALIFORNIA

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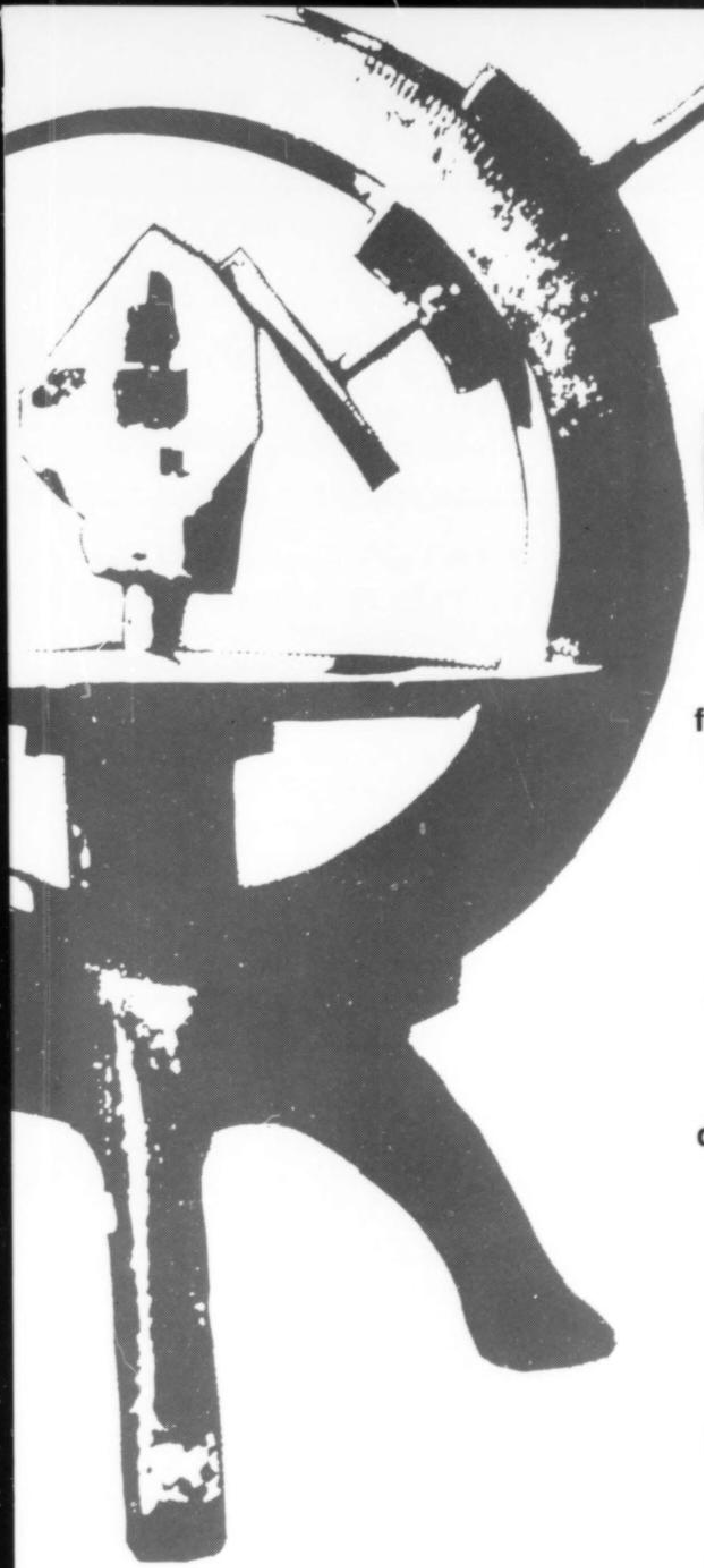

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AZURITE - Bisbee, Arizona. 45 mm by 34 mm, collection of the Department of Mineralogy, University of Aachen, West Germany. Photograph by Olaf Medenbach and Rudolf Baensch.

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WHERE ARE TOMORROW'S?

by Neal Yedlin

Among the things that have become increasingly evident in this hobby of ours is the dearth of young mineral collectors, the "teen" and "preteen" agers. When I was in that age class there were plenty of places here in the East to permit me to give vent to my cravings for buried treasure; places I could visit by streetcar, subway, ferries and commuter railroads. In New Jersey, West Paterson and Prospect Park were operating and available to collectors. Franklin, with its myriad treasures, was also operating; there were available dumps, and a rare visit to the picking table provided the ultimate. The Bedford, New York, pegmatites were working, and the basalt accessories at the middle road at the Palisades, accessible via the Dyckman Street ferry, provided many good specimens, and a great opportunity to study the classic trap extrusives. The terminal moraine at Eastern Parkway in Brooklyn had not yet been completely built over, and gleanings in the washed out furrows following a rainstorm provided many worn, but good, specimens as well as a few brachipods.

Dealers' stocks were such that part of one's allowance could be saved for the purchase of good inexpensive specimens. The Childrens' Museum with its stock of ten cent to dollar specimens and other dealers had low priced material for sale. Thus a youngster could get a good start in assembling a collection. The American Museum of Natural History, under the aegis of Herbert P. Whitlock, its curator, had a "boy scout box". If you could identify it you could have it, nor was it necessary that you belong to this youth organization.

Today there are no easily available localities for anyone. Today there are few inexpensively priced specimens obtainable; fine things command extremely high prices. There are a number of exceptions. One, in Tucson, showed me a half dozen or so of flats of specimens at fifty cents each, for youngsters only. "Dealers have tried to buy the lot, but they're not for sale to them. Of course they're small things, trimmings, and remainders of large lots that I obtain. But they're available, cheap, and are good representations of current minerals". Also in Tucson, another dealer has trays and boxes of fine small specimens, at twenty five cents upward. I have browsed here the Monday following the great show, and have come up with such things as legrandite, köttigite, vanadinites, wulfenites and a plethora of western and Mexican minerals, including boleite from Montana, coppers from Arizona and New Mexico, and others. Of course, in my case they were for micromounts, but the greater part of them was fine for the beginning collector. I note that a few dealers at most shows have an assortment of inexpensive things, starting at about a half dollar to two dollars. Usually these are in the front of their booths, or in trays and cabinets in the rear. Many small but fine things come to light, and a reasonably diligent search by young collectors will unearth (no pun intended) them.

Too few clubs have junior activities, addressed solely to those who may not participate in the usual club functions. Often these are pinpointed to children of regular members, as a babysitting function, but there are clubs whose junior activities rival those of the adults. Such affairs can well be the solution to "Where are new collectors coming from?". Regularly scheduled activities, classes, field trips, all under the auspices of senior club members, should be as well planned and scheduled as the events for the adults. Museums and educational institutions should have their "boy scout boxes". All shows should have competitions and exhibits for the young, not to be labeled "junior activity", but to be shown as regular displays, in competition with adults, and receiving a beginning point handicap.

It is imperative that a replenishment of the supply, not only of specimens but of the collectors, take place, that this hobby of ours may continue to thrive. It is presently running amok at a fast and furious pace, not adequately directed by its own personnel, reminding me of the hurried frenzy of Don Quixote, who was wont to mount his horse and ride off in all directions.

NOTICE

In Volume Six, page 251, under "Swinefordite - the Secret is Out", the quoted material was taken directly from the Eastern Federation *Newsletter*. There was no intent on our part to suggest that the errors and misrepresentations included in that quoted material should be attributed to the original source article, or to Dr. Pei-lin Tien. We are confident that the original news release from the East Carolina University News Bureau was factual and printed without these errors. Furthermore, we do not wish to imply that Dr. Tien has claimed sole responsibility for the discovery of the new mineral.

At about the same time as the above mentioned issue appeared, a detailed description of swinefordite authored by Tien and Peter B. Leavens, appeared in *The American Mineralogist*.

SOME FUN

Since I've been lamenting that there is so little humor in the hobby, especially in its literature, it was with great pleasure that I learned that the Frederick County Rock and Mineral Club produces a bulletin which is called "The Common Ore". A delightful play on words! *Ed.*

SME - AIME NEWS

The Society of Mining Engineers of AIME will hold their Fall Meeting and Exhibit September 1-3, 1976, Currigan Hall. Denver, Colorado.

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friends of mineralogy

by Robert J. Smith
Region 12

Region 12 of the Friends of Mineralogy sponsored a mineral symposium in Portland, Oregon, on October 4, 1975. The meeting was held at the Ramada Inn and the subject was zeolites and associated minerals. Between 90 and 100 were in attendance and all enjoyed a full day of lectures, demonstrations, displays, sales and conversation, especially the latter.

Robert Smith, symposium director, called the meeting to order at 9:45 Saturday morning, and the first speaker was Rudy Tschernich, of Snohomish, Washington, who presented an illustrated lecture on the zeolites of India. Dr. William Wise, University of California at Santa Barbara, was next on the program. His discussing the formation and crystallization of zeolites, and, as addenda, describing the use of the scanning electron microscope was a most interesting part of the day's events. Especially since he had brought with him a number of photographs of minerals exposed to such instrumentation.

Lunch next, at the conclusion of which an auction of select material was held, with John Sinkankas chanting the rites of the sales promoter.

Rudy Tschernich returned to the dais and told of some new and rare zeolite species recently uncovered in the Pacific Northwest. During his talk a very exciting event took place; the announcement of a new mineral species, cowelsite, which has been accepted by the Commission on New Minerals, International Mineral Association. The article describing cowelsite, by Wise and Tschernich, will appear shortly in the *American Mineralogist*.

John Cowles of Ranier, Oregon, for whom the new mineral was named, was a special guest at the symposium. He has been a leading zeolite collector in the northwest for many, many years, and was responsible for bringing to light many rare species and new localities. A selection of locality specimens of cowlesite, and a set of S.E.M. photographs of the mineral, were presented to him as momentos of the occasion.

The final speaker was John Sinkankas, gemologist, mineralogist and author. He presented a general summary in the field of zeolites, an excellent and entertaining talk.

At the conclusion of the formal presentations the group broke to observe and study the displays around the meeting area and to visit the invited dealers. Tables had been set up for trading and microscopic examination of the discussed minerals.

It was the consensus of opinion that the Northwest Mineral Symposium was a long needed event, borne out by the enthusiasm and response to this, the first such venture. It will continue as an annual affair. Planning by the executive committee of the Friends of Mineralogy, Region 12, will begin immediately. The support and help of all members are needed, especially to propose ideas and plans for future programs. A line to Robert J. Smith, Box 197 Mailroom, Seattle University, Seattle, Washington 98122, would be welcome, as would your attendance at the 1976 meeting.

Note by Neal Yedlin: An eight page bulletin on zeolites, giving chemical formulas and crystal systems, and outlining some methods of determination, prepared by Mr. Tschernich, was distributed at this symposium. A copy was sent to me. No price was set for this, but I feel that a dollar would pay for printing and postage, and leave a little for F.M. work in the area. Well worth while. Write to Bob Smith.

by Jim Stauffer
Region 3

Region Three of Friends of Mineralogy presented its third annual symposium on October 31, November 1 and November 2, 1975 at West Chester State College, Pennsylvania. A series of workshops, lectures, an auction of minerals and a field trip were on the agenda, and the facilities of the college, and the enthusiasm of the organizers, augured well for those who attended the sessions.

The promise was fulfilled. On Friday evening a workshop was scheduled. Juliet Reed presented the subject "Using a Geologic Map", explaining their function and arranging for participation by members in the interpretation and actual working of available charts.

Saturday morning sessions consisted of three lectures: by Dr. Sy Greenberg of the geology department of the college - subject: Metamorphic Rocks and Minerals of Pennsylvania; by Jay Lininger: Metamorphic Rocks and Minerals of the South Mountains of Pennsylvania; by Dr. Maria Crawford of Bryn Mawr College: Metamorphic Minerals of the Southeast Area of Pennsylvania.

The afternoon began with Neal Yedlin's presentation of micromounts and early Pennsylvania collectors, emphasizing the fact that in the very community of West Chester were some of the early practitioners of that mineralogical art. This was followed by Pen Ambler's discussion of "Mineral Localities of Central Pennsylvania" and by Del Oswald's talk on the W. W. Jefferis micromount collection, now at the Carnegie Museum at Pittsburgh. Oswald showed slides of the collection, and especially of unusual and unique mounts and methods.

Arthur Montgomery, retired professor of mineralogy at Lafayette College, had presented to the organization some of his mineral specimens for auctioning, and a spirited hour of bidding on such things as gordonite, montgomeryite, kolbeckite and many others, locally and foreign, afforded a great opportunity to enhance the collections of the successful bidders. The prize of the evening, a large mass of material containing kolbeckite, from the fabulous variscite locality at Fairfield, Utah, owned and operated by Montgomery and Ed Over some 40 years ago, was successfully bid on by Del Oswald for the Carnegie Museum.

The proceeds of the auction will go to paying part of the cost of publications and reprints of important articles contemplated by Region Three.

The evening was spent as a free workshop, mineral exchange, and planning session, and was further embellished by Yedlin's slide presentation of "Inclusions in Mica", with projected cleavages of muscovite being utilized instead of photographic slides, and polaroid filters to bring out the interference colors of the various minerals.

Sunday a planned field trip was scheduled, ending a fine week-end session of mineralogy. Not only were Pennsylvania collectors in attendance, but Regions One and Two were represented. Members from New York, New Jersey and Connecticut participated and came away with thanks for Martin L. Anné of Wrightsville and his cohorts, who planned and created the affair, adding to the lore of mineralogy, and who carried out one of the prime functions of the Friends of Mineralogy.

All news and material relating to FM, for Record publication, should be sent to Neal Yedlin at: 129 Englewood Drive, New Haven, Connecticut 06515, U.S.A.

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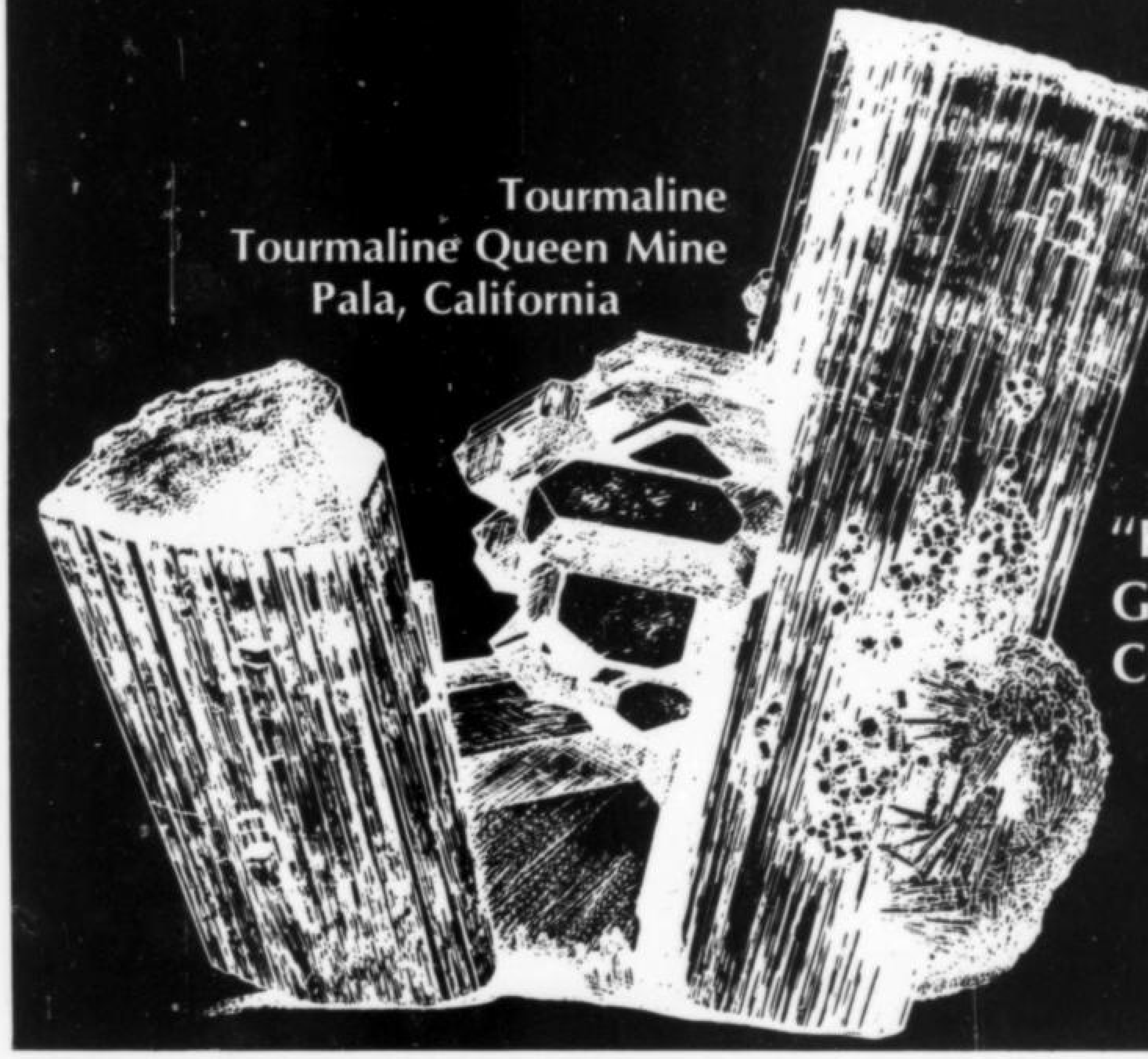

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by Wendell E. Wilson
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This column may take on a different look in future installments. I plan to present a photographic record of some of the finer specimens in private collections, just for the visual pleasure (and envy) they might generate...a sort of What's Old in Minerals with technical comments on the photography. Certainly the specimens need not be the "World's Finest", but this format will, I hope, give some exposure to notable or interesting specimens rarely seen by collectors, and provide interesting background information. Anyone is fair game who will allow me or another photographer into their home for a picture-taking session. If any readers who enjoy photography know of anyone, including possibly themselves, who has 8 or 10 or more particularly appealing specimens they can become a guest columnist in this space. Be sure to record all the details about each specimen that you can pry loose from the owner, and please do not forget measurements. The M. R. staff will help dig out supplementary locality data. Feel free to include data on how you took the shot, and what equipment and techniques you used. A paragraph about the specimen owner would be nice too. Send your photos (as 5 X 7 inch B & W prints) and text to me at the address given above, and most likely they will subsequently appear as an installment of the Photographic Record to the enjoyment and edification of everyone!

Thus far I can tentatively promise installments of my own on the collections of several people including John Barlow, and the back-room vault of the Smithsonian, which rarely sees the light of day. But what I am really searching for are the "closet collectors" like myself, who hide their specimens away with no interest or opportunity to display publicly; next best would be people who only display locally and small museums that don't have travelling displays.

For this installment it was most convenient to start at home and present some shots taken from my own small collection (about 60 pieces). None of these specimens have ever been displayed publicly. One usually achieves the best results photographing one's own collection because it can be done at leisure with always the opportunity for retakes. A few of these pieces have had three or four turns in front of my camera, and I have a neptunite (not shown) which I am sure I have tried to photograph ten times without satisfactory results.

Unfortunately color slides convert poorly to B & W; I did little B & W photography before I began writing these columns, but have since learned some interesting things. Spectacular colors and color contrasts mean nothing of course, and form and luster are everything. With B & W photography there is naturally no need to worry about the color temperature of one's lights. Consequently it is possible to obtain quite a few useful light sources very cheaply. The best and cheapest are simple flashlights, with the largest possible reflectors (2-1/2 or 3 inch diameter). They hold 2 or 3 D cells each. I make a diffusing screen for each one by covering a sheet of thin, transparent plastic with strips of frosty Scotch Magic Transparent Tape.

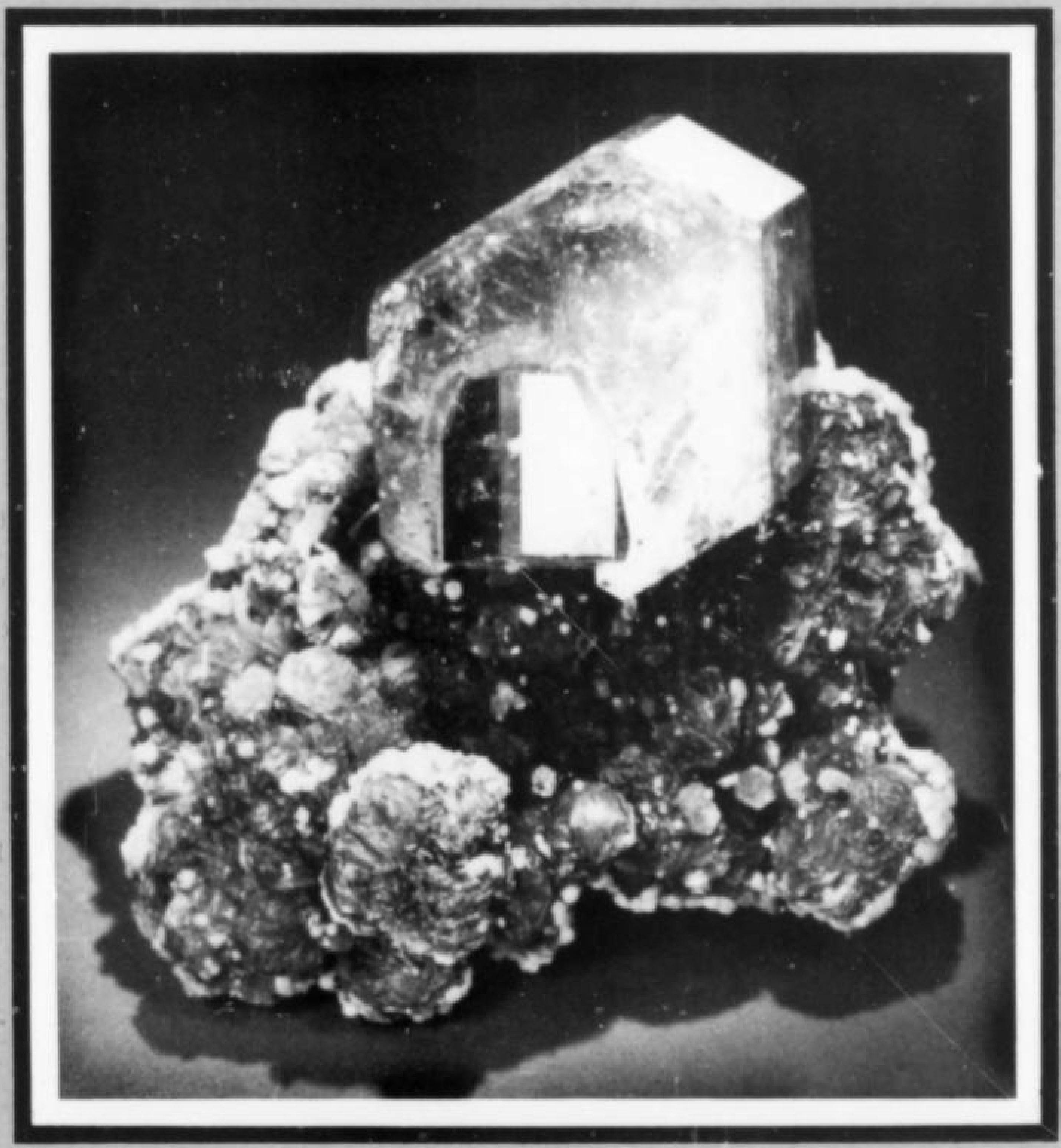
The photos on these pages were taken using Kodak Plus-X and a variety of lighting combinations varying from a single microscope light (the beryl) to 2 microscope lights, 2 tensor lamps and 5 flashlights (the Swiss fluorite). Most often one microscope light was used to illuminate the background in a fuzzy spotlight fashion, and the remaining lights were used to place reflections on selected faces with a minimum of alteration in the lighting of the background. A single shadow is always the goal but it often seems difficult or impossible to achieve the optimum lighting of the specimen and yet produce only one shadow. This is clearly a matter of experience and the development of one's own skill...a never-ending process (especially for me, as you will note several shots here which have multiple shadows).

The captions with the photos need no elaboration, so I will cover some miscellaneous topics that have been accumulating on my desk and in my head:

A couple of publications have come out that you might like to pick up. One is an article on the photography of minerals by William W. Pinch (owner of the Pinch Mineralogical Museum) and Thomas P. Hurtgen which appears in the 9th Here's How "idea book" (number AE-95) from Kodak. You will probably have the quickest results by sending $3.50 directly to Eastman Kodak Company, Dept. 454, Rochester, New York, 14650. The authors cover a variety of topics including several not touched upon in this column as yet, and have the advantage of color reproductions of many examples. The matter of scale indicators is discussed as being appropriate for some specimens, and although I have used such devices (coins, a scale bar, textured fabrics, etc.) I find that there is always a sacrifice in aesthetics. One must weigh this against the dramatic effect, if any, of making the size of the specimen immediately apparent. If no scale is used just be sure to measure the specimen and mark the size on the slide mount when it comes back from the processor. I also add the mineral name, locality, and owner, plus my own name of each slide mount so, needless to say, one must print small to get it all on. Some people prefer to note the SCALE, e. g. "scale = 10:1" which would mean that if the specimen measure 1 inch on the slide, it is actually one-tenth inch in real life. I prefer a notation such as "large xl = 16 X 20 mm"; then you don't have to measure the specimen on the slide to figure out how big it is in real life. But this is trivial; the important thing is to make some kind of size notation on the slide. For an entertaining trick shot I heard of one photographer who made a detailed model of an Estwing rock pick...about two inches in length. He would then lean this against specimens "for scale" and have a lot of fun showing the resulting slides to incredulous fellow collectors!

Another topic discussed in the Pinch-Hurtgen article is photography of specimens in display cases at mineral shows and museums. In recent years I've found this to be one of the most enjoyable uses for my camera. I have several hundred such slides now and they are always a pleasure to look over. Over the years one can follow specific specimens from collection to collection, and also keep track of those pieces you may later wish to haggle over with the owner. In fact I recently was feeling starved for a new specimen so I looked over all my show slides, and in so doing saw a fine piece I wanted in a dealer's display. I called the dealer, found he still had it, and we came to an agreement over it! It was like shopping at the show all over again. When taking these pictures I often put the lens right up against the glass, focus, and shoot, using an automatic electronic flash (a Vivitar 281). The flash has an electric eye of its own, and senses when enough light has bounced off the field of view for a good exposure. Then it shuts itself off. The duration of the flash can be anywhere between 1/1000 of a second

Figure 1. Below, fluorapatite (moss-green, crystal is 20 by 22 mm) from Panasqueira, Portugal. See M. R. 2, 2, p. 73. The mine operators are now vending specimens although they appear to be markedly careless in protecting them from damage.



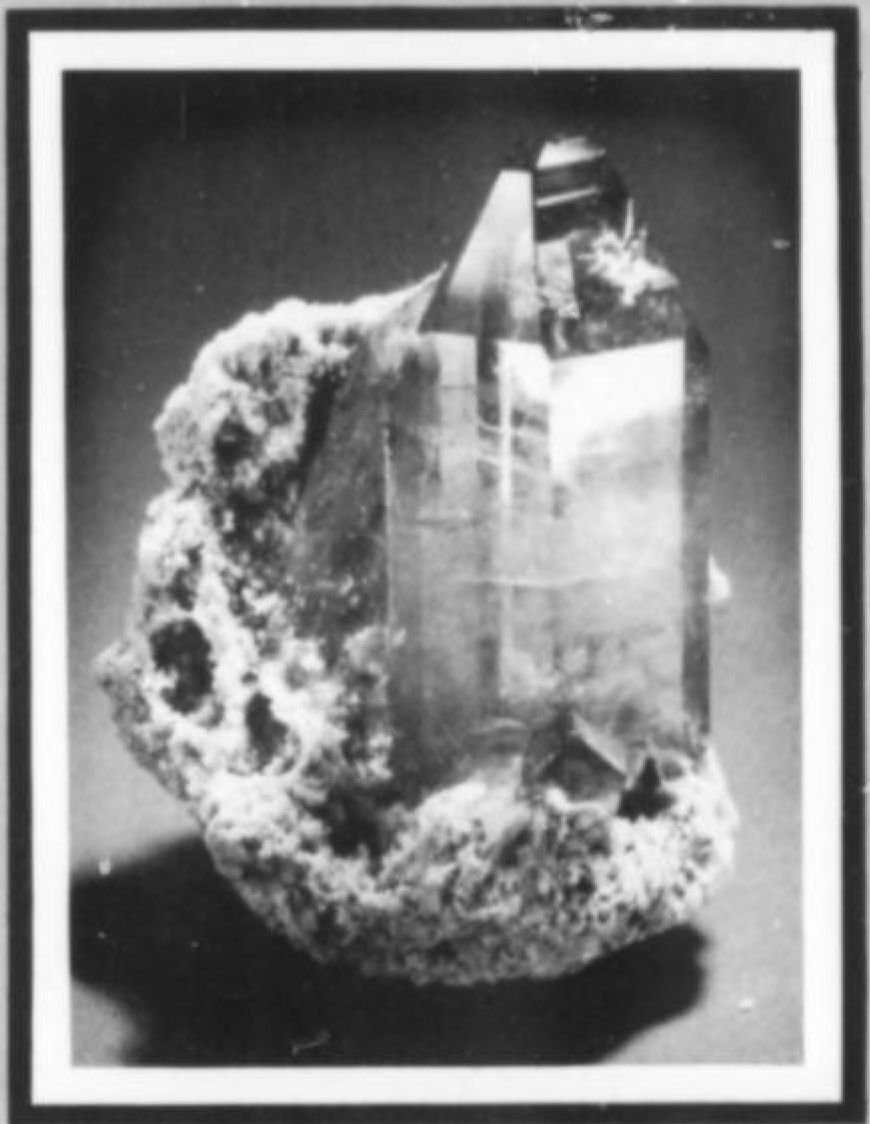


Figure 2. Above, topaz (sherry-colored crystal 24 by 11 mm) from the Thomas Mountains, Juab County, Utah. Although collecting is tedious, this locality should continue producing specimens and gem material for decades. Good crystals attractively perched on matrix, such as this example, are still rare, (see Lapidary Journal, April 1973 and May 1974). Fine specimens with bixbyite on purple fluorite were available at the last Detroit Show. (1975)

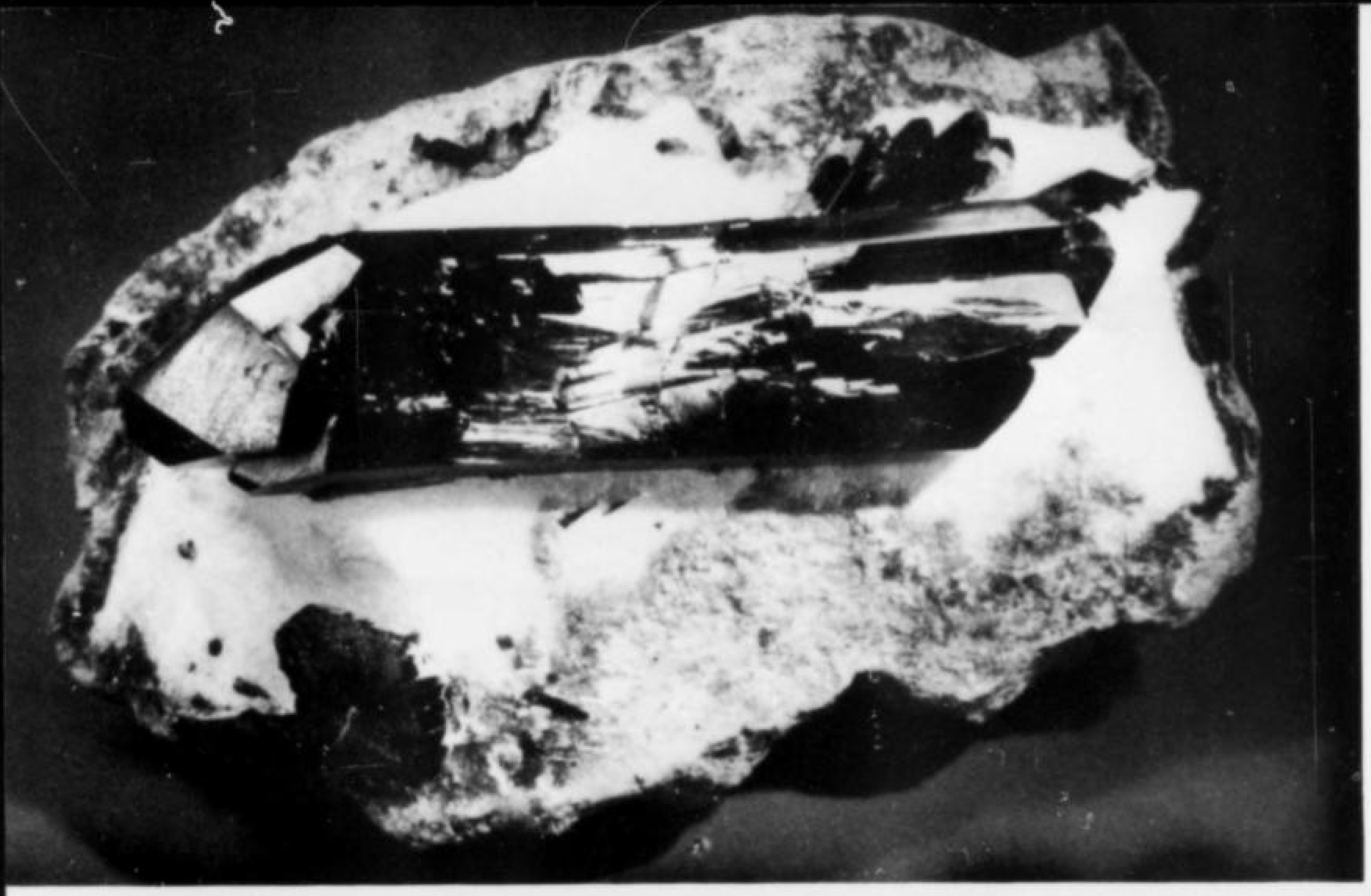


Figure 3. Left, neptunite (black, doubly terminated crystal 1 by 4 cm) from the Dallas Gem mine, San Benito County, California. New veins of this material have not been discovered for years but new specimens are still being occasionally found by reworking of the dump material. **Figure 4.** Below, brazilianite (gemmy yellow-green crystal 3.8 cm diagonally) from Conselheiro Pena, near Linopolis, Minas Gerais, Brazil. This is one of the specimens from the first (and best) find of 1962.

and 1/30,000 of a second; truly a remarkable device! Getting up against the glass eliminates any possibility of unsightly reflections. If there is a fine specimen you wish to shoot, but it's in the back row, try using a telephoto lens (e. g. 105 mm) and an extension ring or two... works great. If it's toward the front a macro lens is best.

Rather than go off on any more tangents generated by the Pinch-Hurtgen article, let me simply recommend that you order a copy. So little has been written on mineral photography per se that it is worthwhile just to read about another photographer's approach; these authors have a good one.

The other publication you may find valuable is Petersen's Close-up Photography, a magazine-format publication by William J. Owens which you may have seen on news stands. If you missed getting a copy send $2.95 to Petersen Publishing Company, 8490 Sunset Blvd., Los Angles, CA 90069. Contained is an 80-page thesis on nearly all aspects of close-up photography including equipment, optics, lighting, and valuable tips, but not mineral photography specifically. (Doesn't it sometimes seem that photography consist more of "tips" than anything else?)

From time to time we all encounter our nemesis: the beautiful but frustratingly UNphotogenic specimen. How to recognize such a piece before wasting film on it? If you hold the item and find that you want to keep rolling it around and turning it, it may turn out to be a dog on film. Try holding it stationary and closing one eye so you will see just what the camera will see. If it suddenly looks drab, you'll know the slides are likely to be disappointing.

Another opportunity for those with the urge to see their work in print: John White is always pleased to receive contributions for his What's New in Minerals column. If there is a new strike of something on the market, and you have access to a fine example of it, send him a 5 X 7 B & W print, with or without a write-up, and include size and ownership; you will of course be credited as the photographer. Our overworked editor has been forced to do must of his own photography so he greatly appreciates contributions!

Figure 5. Quartz (colorless crystal 4 by 5 cm) var. Herkimer Diamond, from Middleville, Herkimer County, New York.

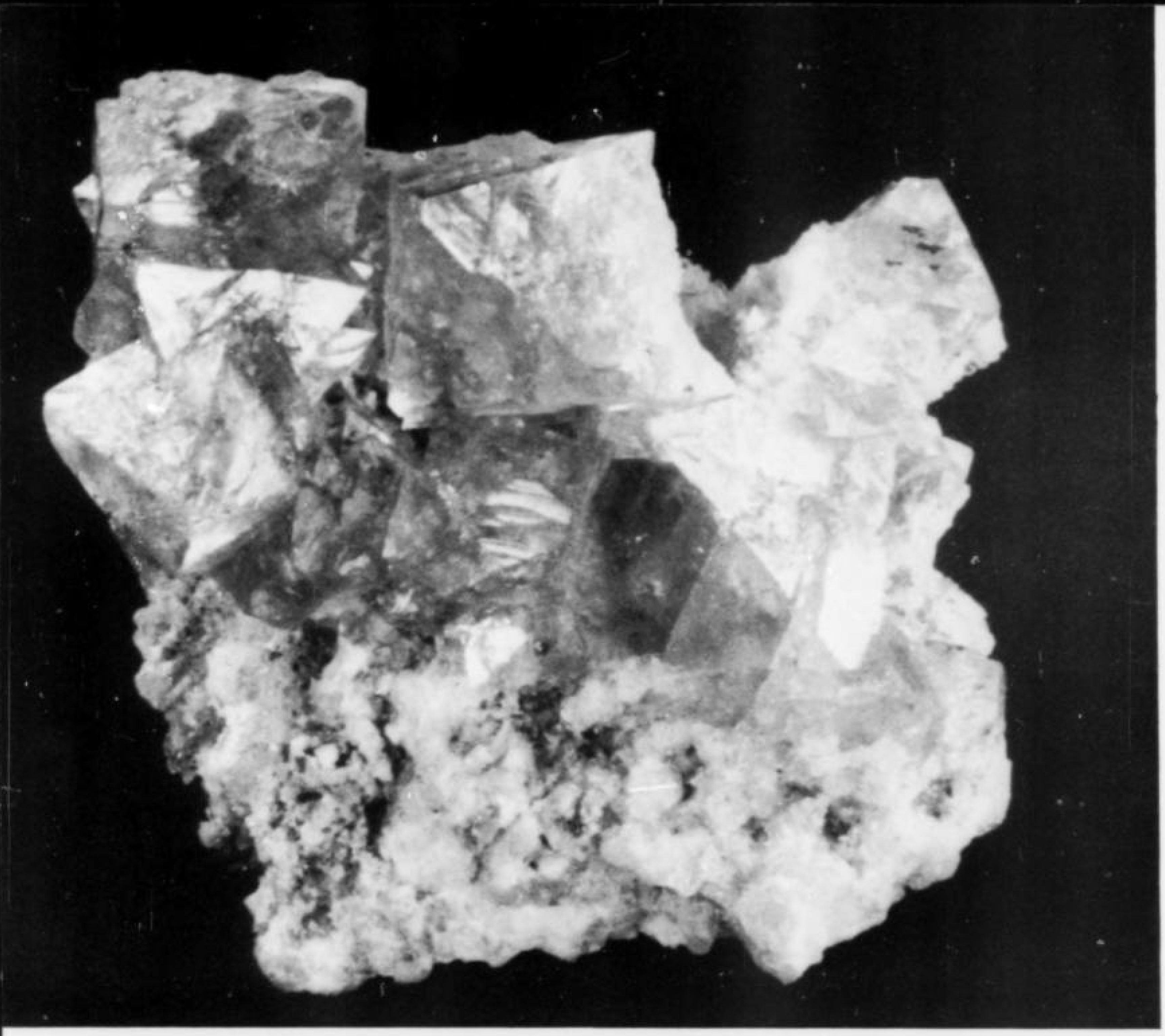
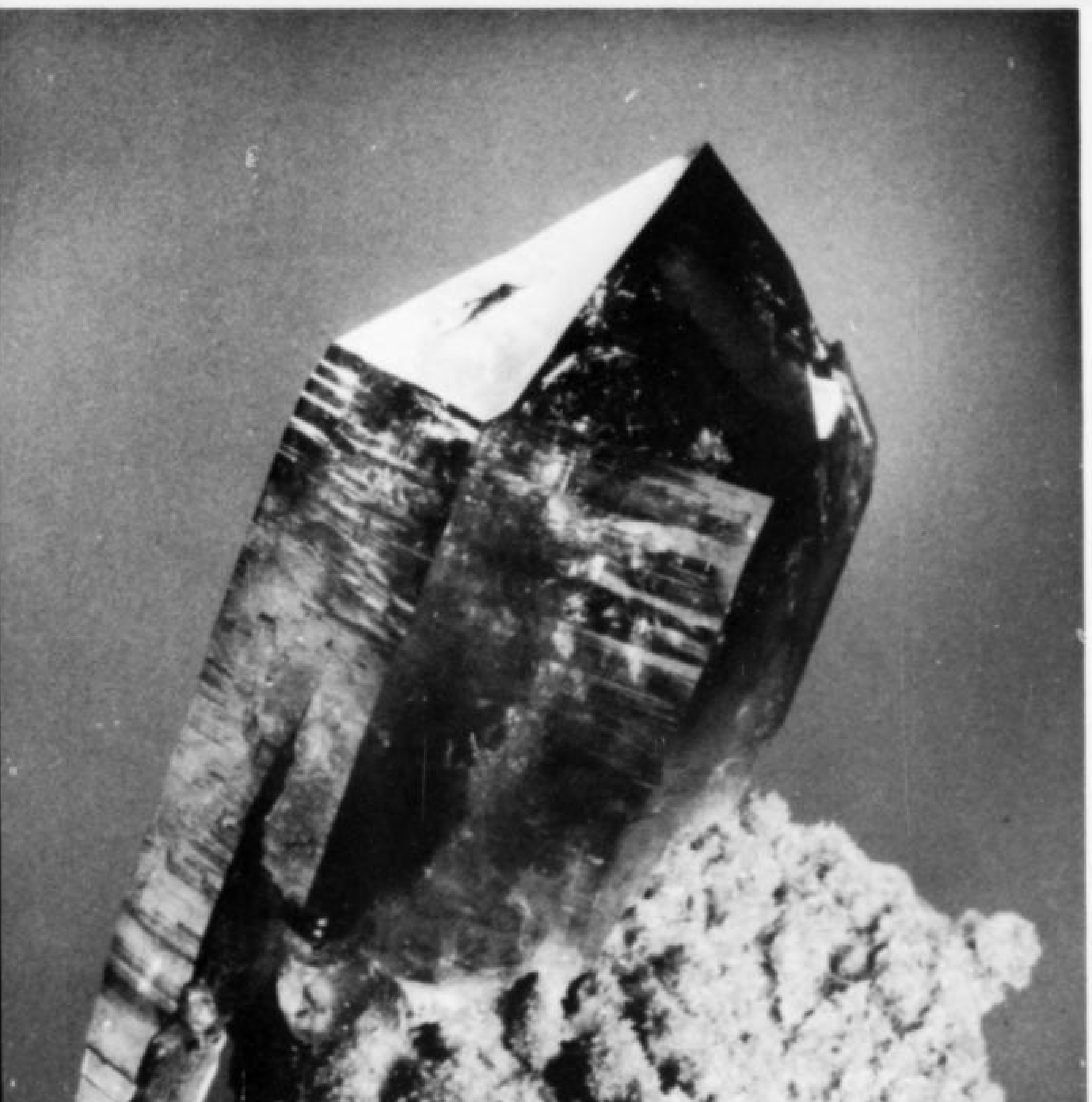


Figure 6. Left, fluorite (rich pink, largest crystal is 1.5 cm on edge), on white granite. From Staupliloch, near Göschenen, Switzerland.

Figure 7. Below, quartz, var. amethyst (rich purple throughout, 5 by 2.3 cm crystal) from near Las Vigas, Vera Cruz, Mexico. This locality has produced specimens sporadically for almost 20 years and, although closed at this writing, is due to be reopened very soon by John Whitmire, a wholesaler from Yuma, Arizona.



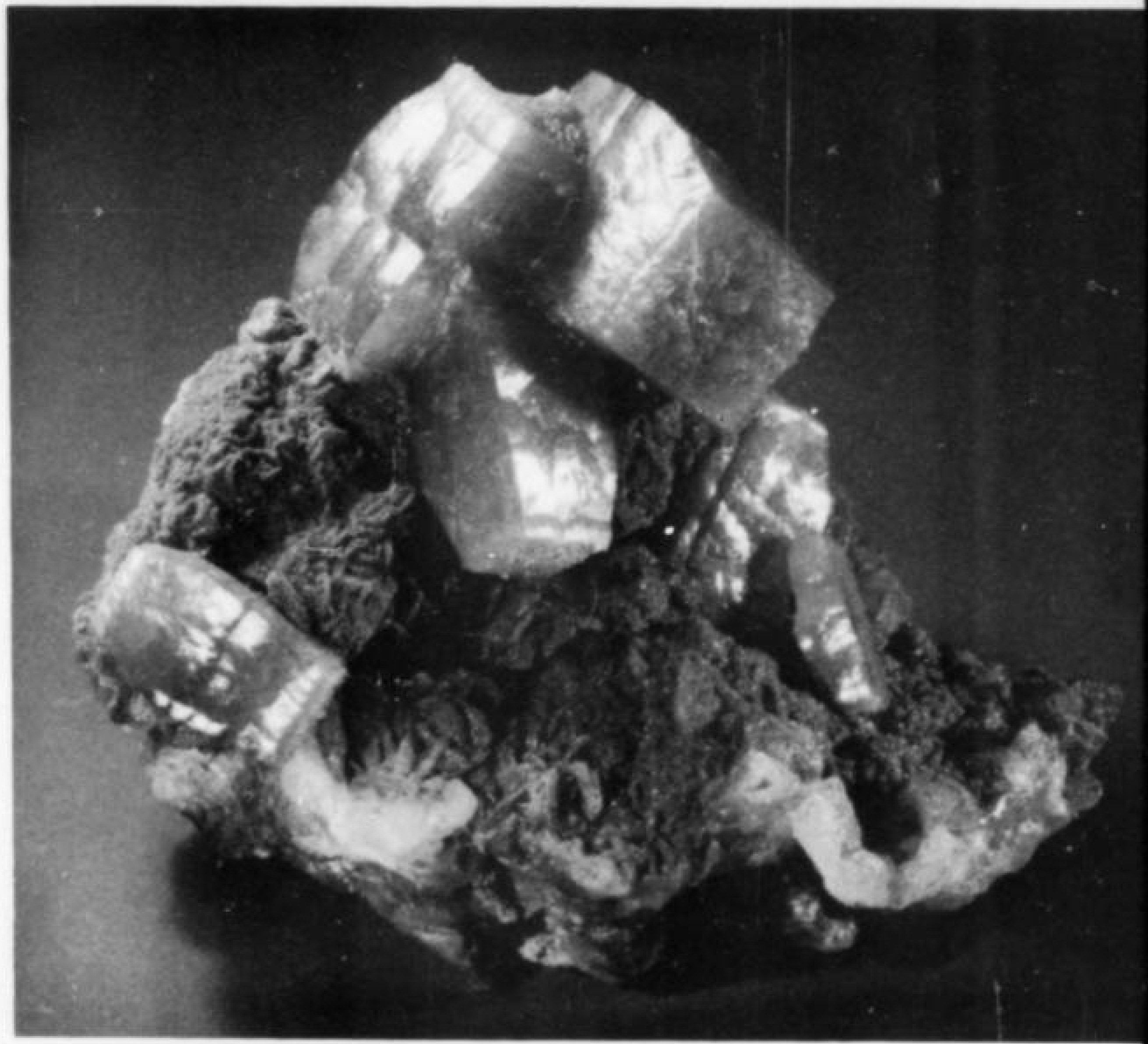


Figure 8. Wulfenite (orange, crystals measuring 1.7 by 1 by 1 cm) Erupcion mine, Los Lamentos, Mexico. The Erupcion mine has produced far less wulfenite than the adjoining Ahumada mine, but both are now closed. At least a dozen recognizeable habits have appeared from this district.

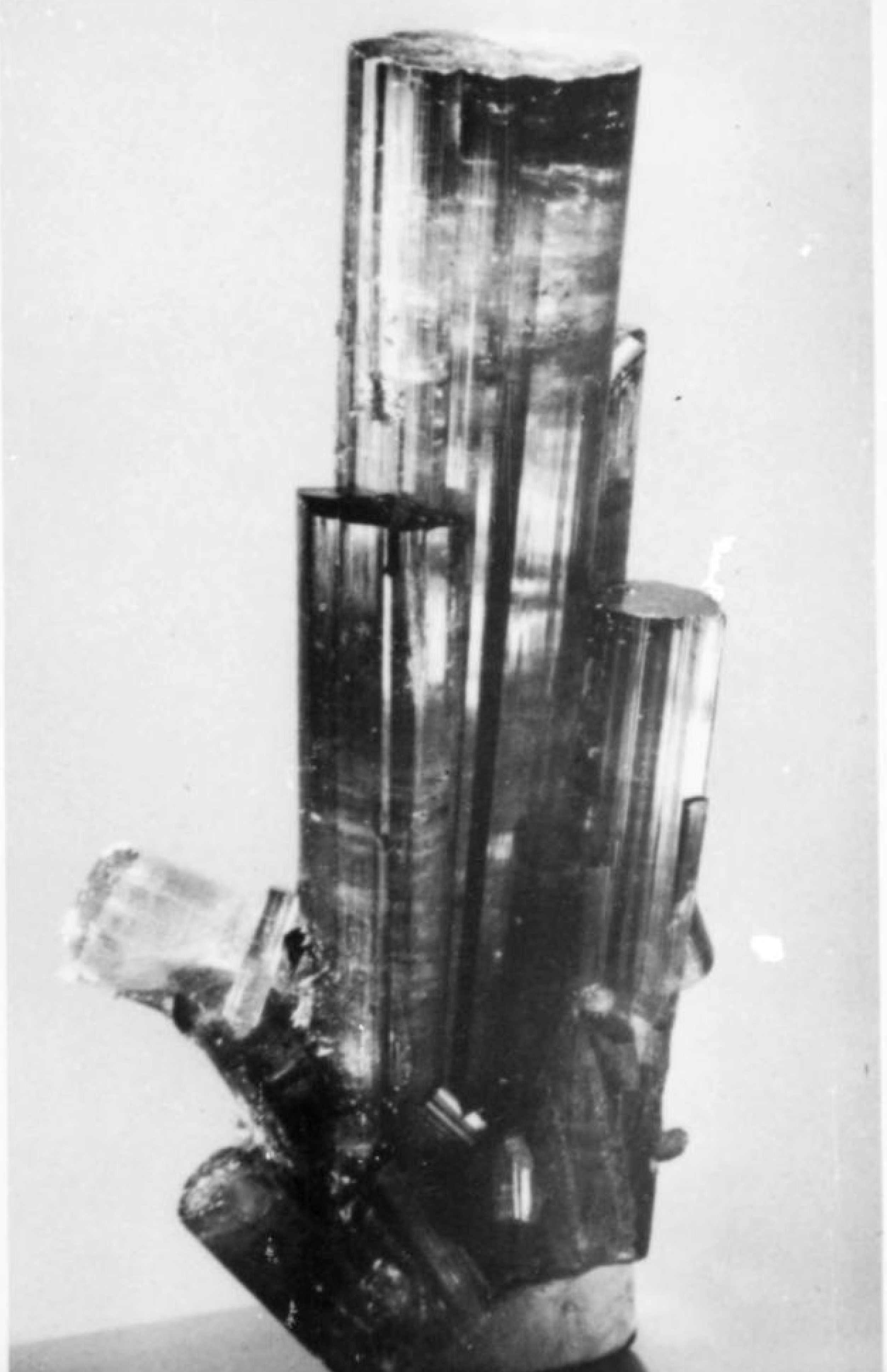
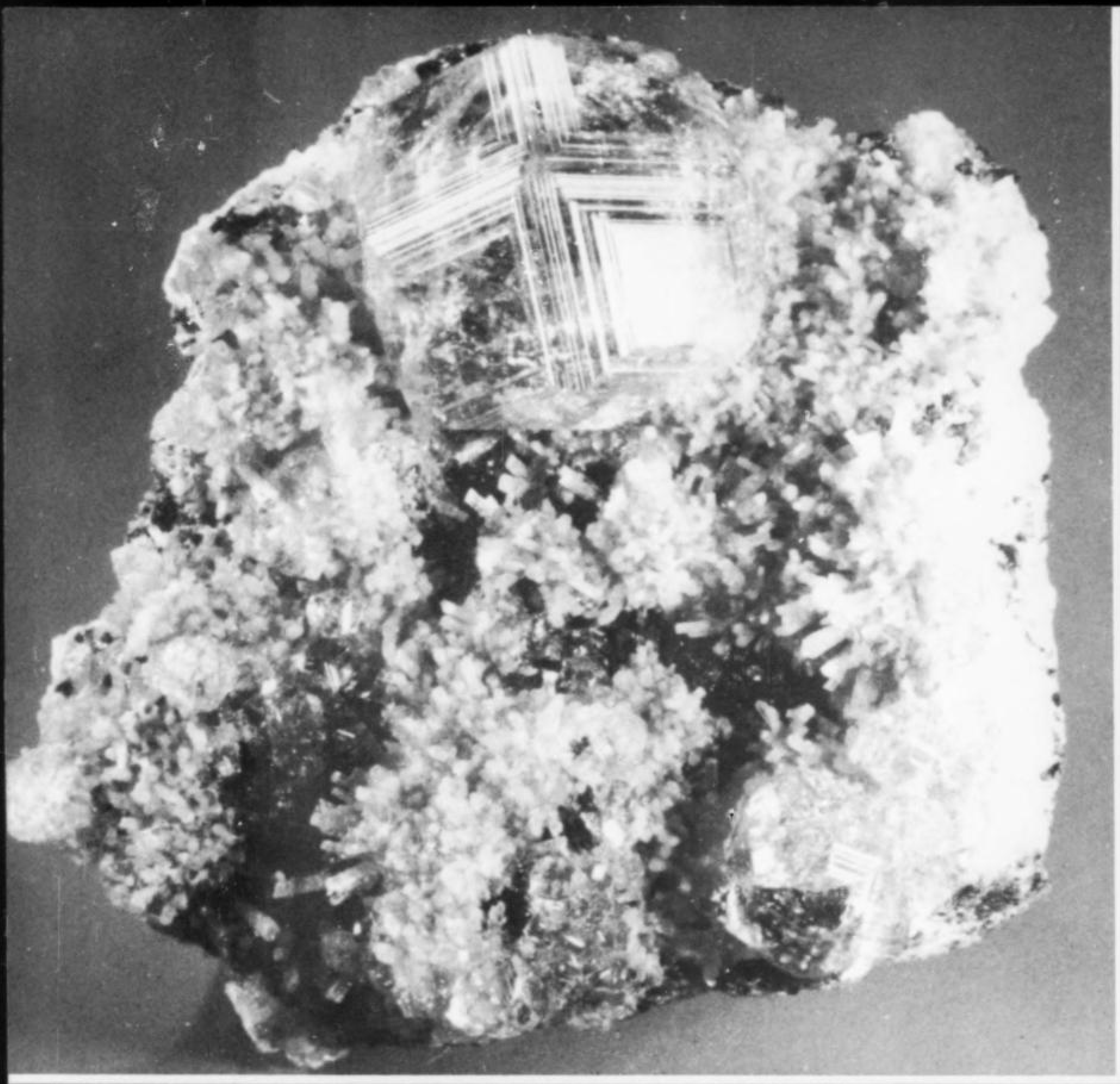


Figure 9. Beryl (light green, 103.5 cts., 3 by 3 cm), from Pisek, Jihocesky, Bohemia, Czechoslovakia. This apparent "floater" was purchased from a 100-year-old Austrian collection by the gem dealer R. C. Romanella and brought to the United States. The top and bottom have sharp-faced hexagonal pits; the sides have no prism faces but rather steep bipyramid faces. The interior is water-clear. **Figure 10.** Elbaite (green with pink center and blue tips, 8 cm tall) from the Santa Rosa mine, Minas Gerais, Brazil. This locality produced many specimens but was completely mined out by garimpieros in only 6 months of 1967. The specimens were extraordinarily beautiful, but not one carat of facetable tourmaline was found.



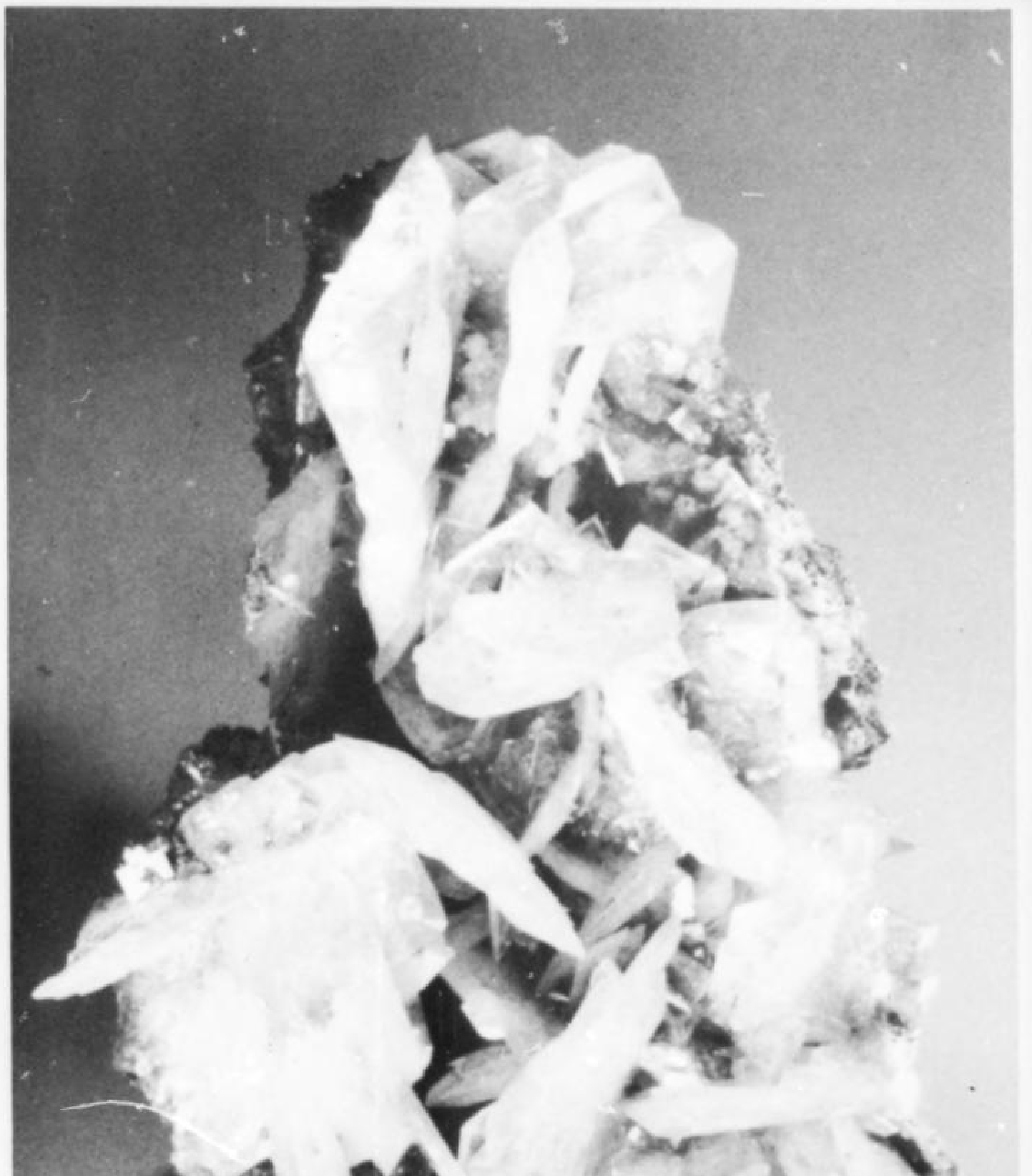


Figure 11. Top left, grossular (orange crystal 18 by 18 mm) on diopside matrix. Asbestos, Quebec, Canada. The crystal is so transparent that it appears as almost a "ghost" over the matrix. This locality is still producing. **Figure 12.** Bottom left, wulfenite (orange, specimen measures 5.5 cm tall) from the San Francisco (Cerro Prieto) mine near Magdalena, Sonora, Mexico. This locality is not exhausted. See M. R. 3, 4, p. 180. **Figure 13.** Center, wulfenite (pinkish orange-red, 3.5 by 3.2 cm) from the Red Cloud mine, Yuma County, Arizona. One of the lesser single crystals found by Ed Over in 1938, but still superior to almost everything found since. See M. R. 6, 4, p. 176.

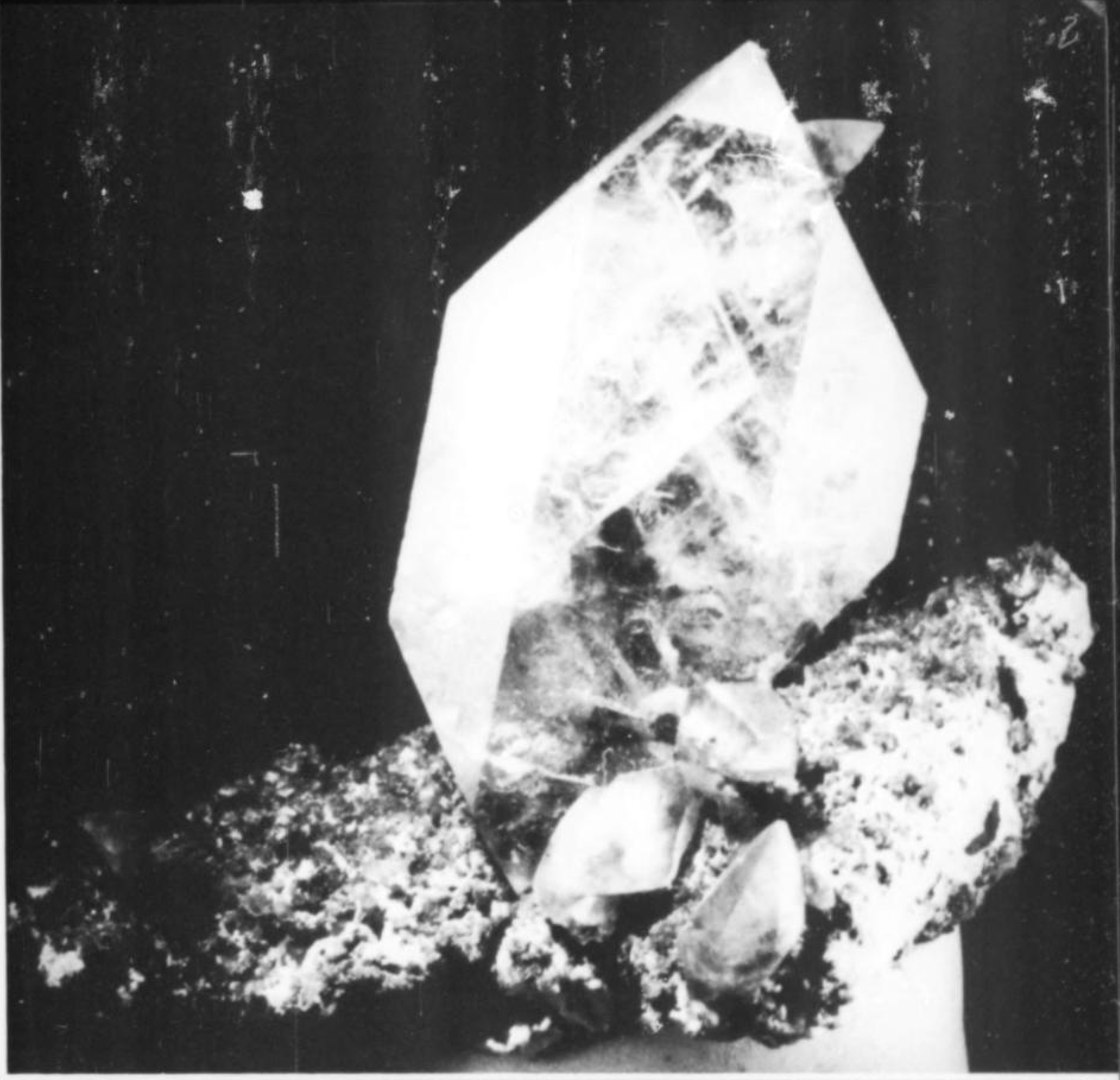
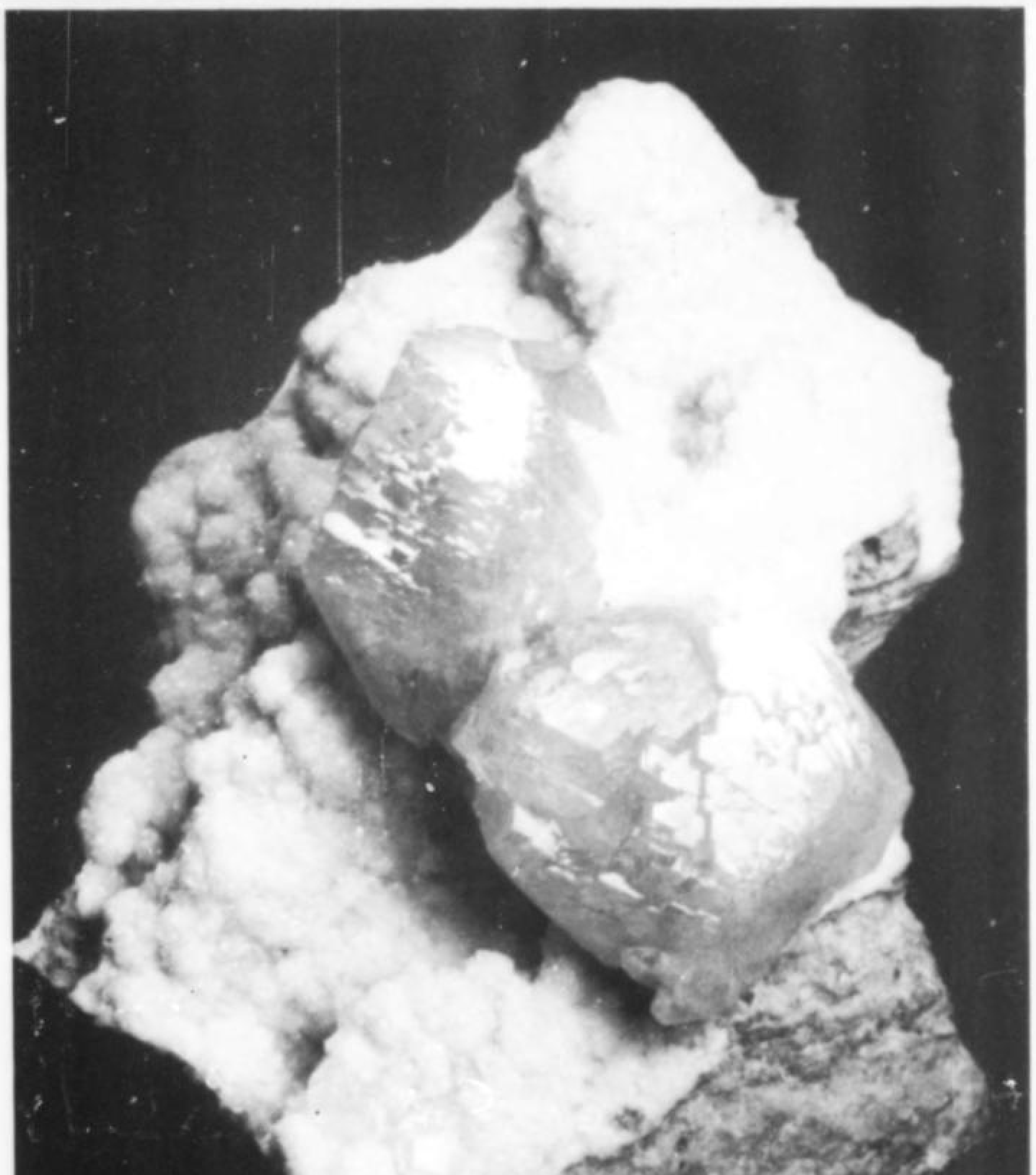


Figure 14. Bottom right, smithsonite (apple-green, crystals are 1.7 cm long) from Tsumeb, Southwest Africa. **Figure 15.** Top right, celestine (pale blue crystal 3.7 by 2 cm) from the Scofield quarry, Maybee, Michigan. This locality was once open to all collectors and produced fantastic specimens of celestine with crystals up to six inches and slabs of blue crystals topped by sulfur crystals. Then, in the mid-sixties, a collector was injured in an accident and sued successfully for damages. The mine has been closed to collectors ever since although a very few people have occasionally been granted access.



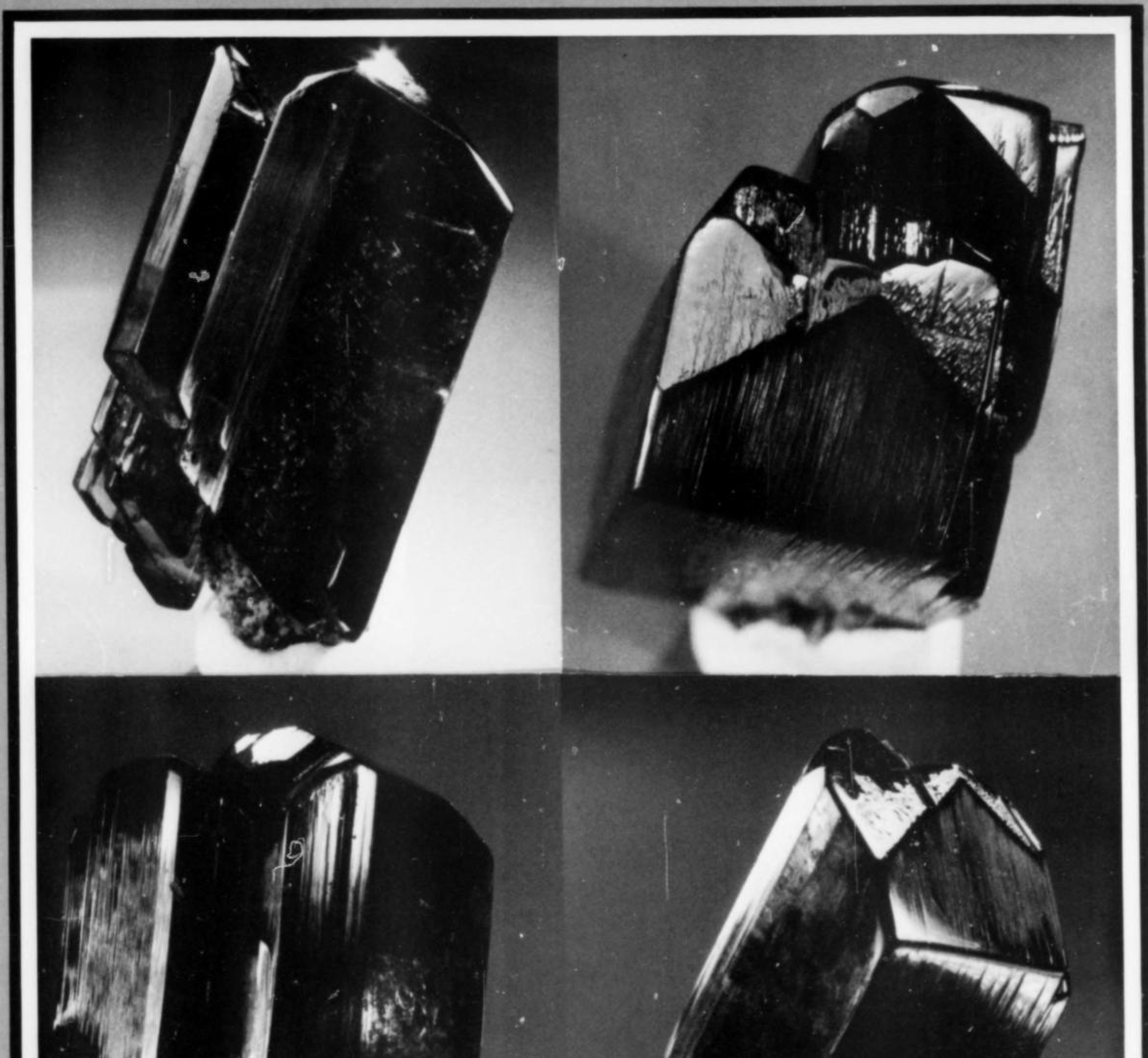


Figure 16. Vivianite (deep green, 2.7 by 1.5 by 1.3 cm), doubly terminated on a small piece of granular matrix, (white clay is attached to the matrix in these photos), from the San Antonio mine (?), in the Santa Eulalia District, Chihuahua, Mexico. Only a handfull of crystals in this size range are known; the one owned by Gene Schlepp of Western Minerals is probably the largest, and the one owned by the Smithsonian has more matrix. But this piece has an unusual number of will-developed modifications. Crystals reaching a few millimeters are seen on the market, but infrequently. I would like to hear from anyone with a Mexican crystal in the 3 cm, or larger, category, to help pin down the locality.

Figure 17. Fluorite (light yellow with small brown centers, the largest crystal is 3.2 by 2.9 by 2.7 cm) from the May Stone Company quarry, Ft. Wayne, Indiana. This locality, too, was open to all collectors for quite some time, but after the publication of an article on the mine in a national hobby magazine the locality was so deluged by collectors that the owners felt compelled to close it. Specimens are still occasionally collected and released to the market.

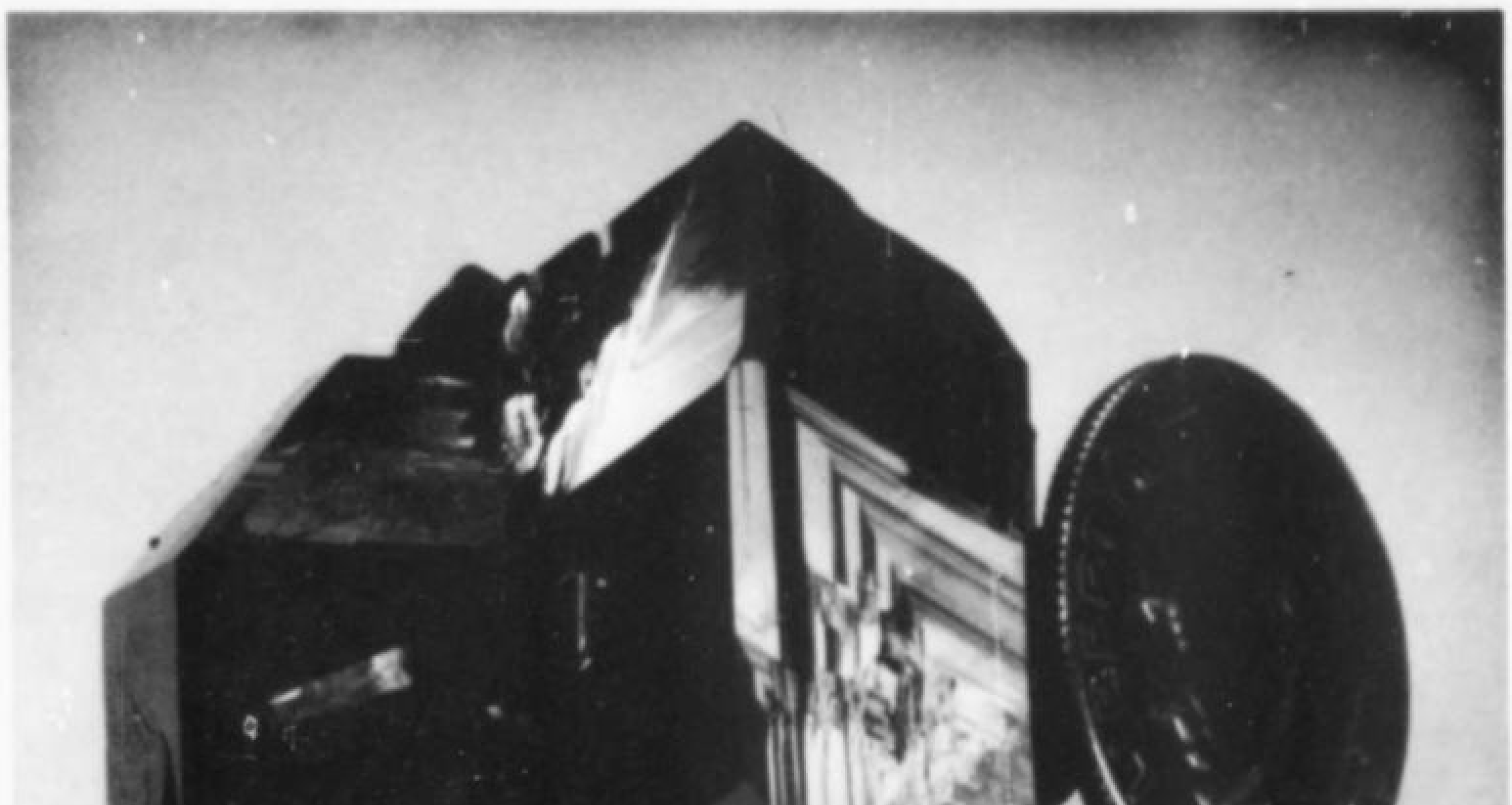


Figure 18. Dioptase (Thalo green, the larger crystal measures 2.9 by 1.6 cm) from Tsumeb, Southwest Africa. Mining at Tsumeb is currently moving through a dioptase zone, and specimens are momentarily rather plentiful on the market. Nonetheless, crystals over 15 mm are extremely rare and crystals over 2.5 cm, like the one pictured, are almost unheard of.

PERSONALITY SKETCH

CLARENCE COIL

by Barbara L. Muntyan

He has brought out more superlative Colorado amazonite crystals than any other person. He is responsible for finding probably the best goethite crystals ever dug in Colorado. He's been exploring and mining in the Pikes Peak granite for over forty-eight years. Pioneer, miner, mineralogist, photographer, philanthropist, amateur historian, and gentleman: he is Clarence Coil.

Clarence Coil is in semi-retirement now, due to a severe back injury which occurred several years ago. Gone are the days of packing into the wilderness. His digging now is more or less confined to a supervisory capacity, as his son David or his daughter Barbara eagerly dig into the magic spot Clarence has located. But his eyes light up and his voice acquires an excited ring as he reminisces about the early days in Colorado, his mining experiences in the Pikes Peak area, the famous mineralogists and explorers he has known, and the many activities in which he has participated and supported during the last half century in Colorado Springs.

Coil is a modest man. One wonders whether he really knows that he is responsible for bringing to light some of the most beautiful, most spectacular, and most sought-after minerals ever dug in this country. He is familiar with nearly every inch of the Pike National Forest and the tens of thousands of pegmatite pockets which dot the Pikes Peak granite formation of Park and Teller Counties. Coil and his former partner, the late Orville A. Reese, dug a good percentage of them; they rarely came home empty-handed.

Yet it was the sheer love of nature, of companionship in the wilderness, of the excitement of finding new mineral pockets, which seems to have motivated Coil and Reese.

Coil is nevertheless well aware of the value and importance of his finds. He and his partner Reese donated 5,000 square inches of Colorado crystal material which was placed in some of the outstanding mosaic work of the U.S. Air Force Academy Chapel near Colorado Springs. And the Coil family has donated not one, but several, collections to various public institutions in and near Colorado Springs. Both the public library and the Pioneer's Museum boast fine collections of Colorado minerals (and many of the specimens were dug by the Coils, as well). The Air Force Academy is also the recipient of a study collection of minerals donated by the family.

Coil is not a trained mineralogist; he is a commercial photographer by profession. But there cannot be many better field geologist around. It has been said that Clarence Coil can walk up to any spot, pick his ground and start digging, and will always find a pocket. "Always" is perhaps a slight embellishment, but his instinct for locating pegmatite pockets in the Pikes Peak granite is phenomenal from all accounts.

This ability is all the more noteworthy when one understands the character of the area's geology. Unlike the pegmatites of Southern California, the pegmatites of this part of Colorado usually occur as collapsed lenses in rotted granite having the consistency of coarse, gravel-like soil. Frequently the entire pocket is covered with pine needles and trees. The unsuspecting could probably pitch a tent right over a fabulous pocket and be none the wiser.

Both the son and daughter of Clarence Coil share his love of field collecting and have been with him when he has made a number of his important finds. Mrs. Coil, "Dot," is a cheerful and motherly lady who has kept the home fires burning and the food hot while her family was out getting dirty and hungry in the pursuit of the minerals.

Amazing as it might seem, most of Clarence Coil's great finds were made relatively recently. He and his son David dug down twenty-seven feet a couple of years ago to clean out a huge pocket of goethite. This pocket, reputed to have produced the best known Colorado goethite, was complete with terraced levels, shorings, ladders—the whole works.

The Coil's best known find, of course, were the large crystals of deepest blue amazonite with a striking overgrowth of albite of them, which gave a "striped" effect to the crystals. Some of these single crystals and groups were found with snowy albite and cleavelandite associated; a few were found with smoky quartz, although these were quite rare. At the time these specimens were found, they had the deepest color and most striking appearance of any amazonite ever found in this country. Many of these crystals can now be found in the major public and private collections in this country and in Europe.

It is interesting to note that Clarence Coil, his son David, and his daughter Barbara are proudest of their find several years ago of two barylite crystals, one of which was donated to the Smithsonian. While these may have been the two most unusual mineral specimens Coil has located, his real contribution to specimen mineralogy must be the hundreds of superb and classic Pikes Peak minerals which Coil has brought out over the last half-century. For sheer quantity, beauty, and perfection, these will be his lasting mark on mineralogy.

Note: The editor is anxious to have more readers submit Personality Sketches for publication in the Mineralogical Record. This will be a regular feature if only more such sketches are received. Ed.

The new DIRECTORY OF MICROMOUNTERS

The International *Directory of Micromounters* is published biennially by the Baltimore Mineral Society at the time of its annual Micromount Symposium in September. The 8th edition will be published in September of 1976, and in order for it to be as correct and up-to-date as possible the following information is needed.

1. The new (and old) address and/or name of each person listed in the 7th edition who has moved and/or changed his or her name since it was published.
2. Identification of each person listed in the 7th edition whose mail is undeliverable at the address shown therein.
3. The zipcode of each Canadian micromounter listed without zipcode in the 7th edition (there are lots of them).
4. The full name, address and zipcode of a micromounter who wishes to be listed in the 8th edition and who was not (or who does not remember whether he or she was) listed in the 7th edition - we will do the checking if you are not sure. If a listing is to be for both husband and wife, please also furnish the wife's first name.
5. The full name and address of each dealer who sells micromount material or tools and who would like to be listed, without charge, in the Directory of Dealers which is a part of the Directory of Micromounters.
6. If you are a member of a micromount group or society, please ask your secretary to send an up-to-date list of your members.

The cost of each copy of the 8th edition will be 60¢; by mail, $1 (the same as for the 7th edition) - this applies to the United States and Canada; for foreign countries the mail cost is higher because of increased postal charges. All information and checks for copies to be mailed should be sent to: Randolph S. Rothschild, 2909 Woodvalley Drive, Baltimore, Maryland 21208, U.S.A.

TOM DAUGHERTY • MINERAL SPECIMENS

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THE DESERT INN • TUCSON, ARIZONA
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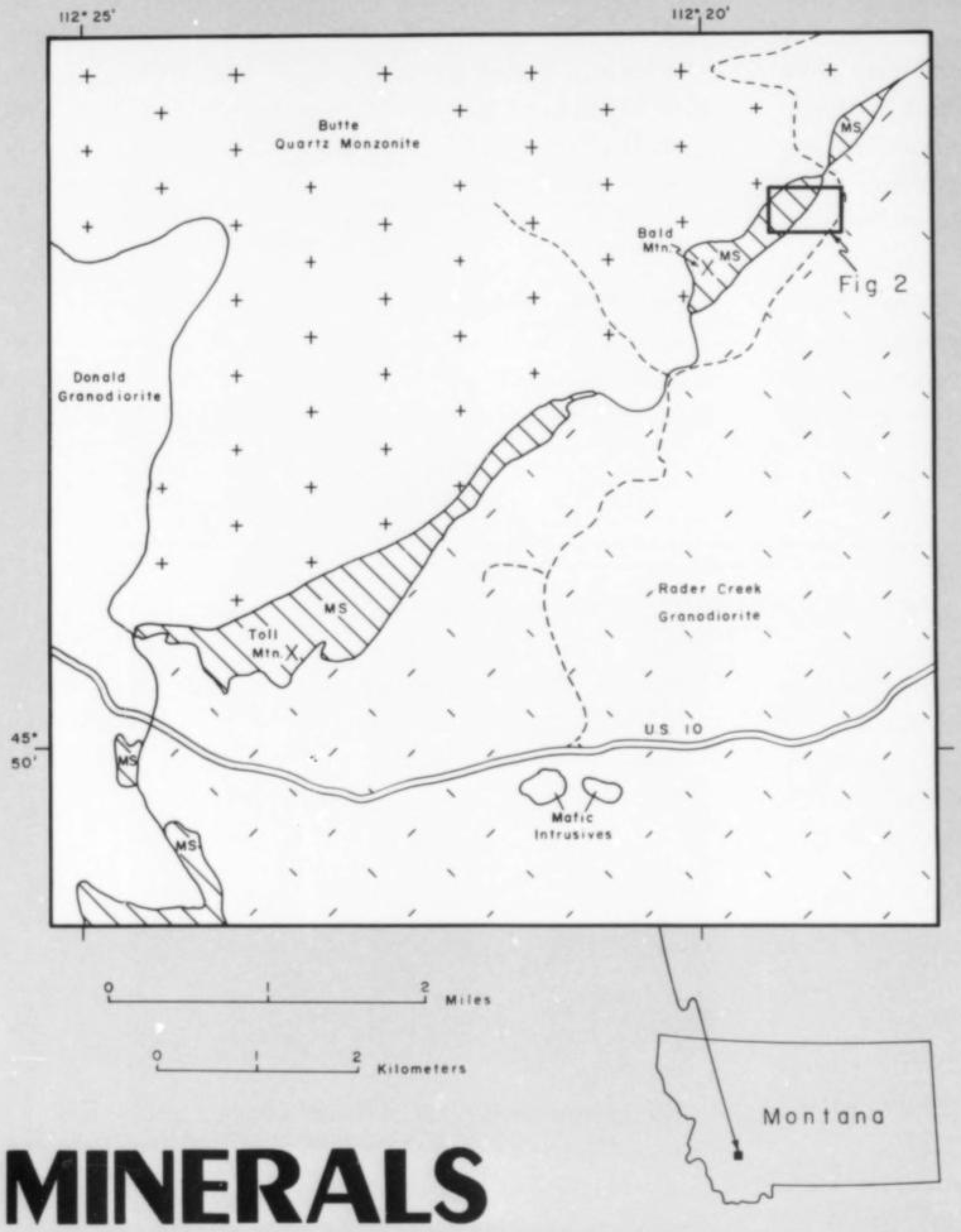

***Figure 1.* Location and general geologic setting of the Bald Mountain area. Metasedimentary rocks are indicated by MS. All other rock types are intrusive igneous rocks. Adapted from Hamilton and Myers (1974) and Smedes *et al* (1968).**

MINERALS OF THE BALD MOUNTAIN SKARN, PIPESTONE PASS AREA, MONTANA

by Robert L. Reuss **Tufts University, Geology Department, Medford, Mass. 02155**

Mineralogists are well acquainted with fine mineral specimens from the copper mines in the Boulder batholith around Butte, Montana. However, relatively few are acquainted with the well-developed skarn assemblages formed as a result of the emplacement of the Boulder batholith into pre-existing limestone country rocks. The skarn minerals on Bald Mountain in the Pipestone Pass area are particularly attractive because crystals of diopside, grossular, and apatite occur in a matrix of sky-blue calcite.

GEOLOGIC SETTING

The Bald Mountain skarn is located in one of several large masses of metamorphosed sedimentary rocks which were intruded, deformed, and metamorphosed by igneous rocks of the Boulder batholith (Fig. 1). The geologic sequence of events which produced the Bald Mountain skarn began in the Precambrian with the widespread deposition of shales, impure sandstones, and local dolomitic limestones of the Belt series. This series subsequently was buried under more than 1300 meters of marine Paleozoic limestones, dolomites, and subordinate quartz sandstones. Part of this limestone sequence would eventually become the Bald Mountain skarn. Igneous activity began approximately 78 m.y. ago (Tilling, 1973) in the Cretaceous period as magma moved upward along zones of weakness in the sedimentary rocks, finally erupting at the surface to form

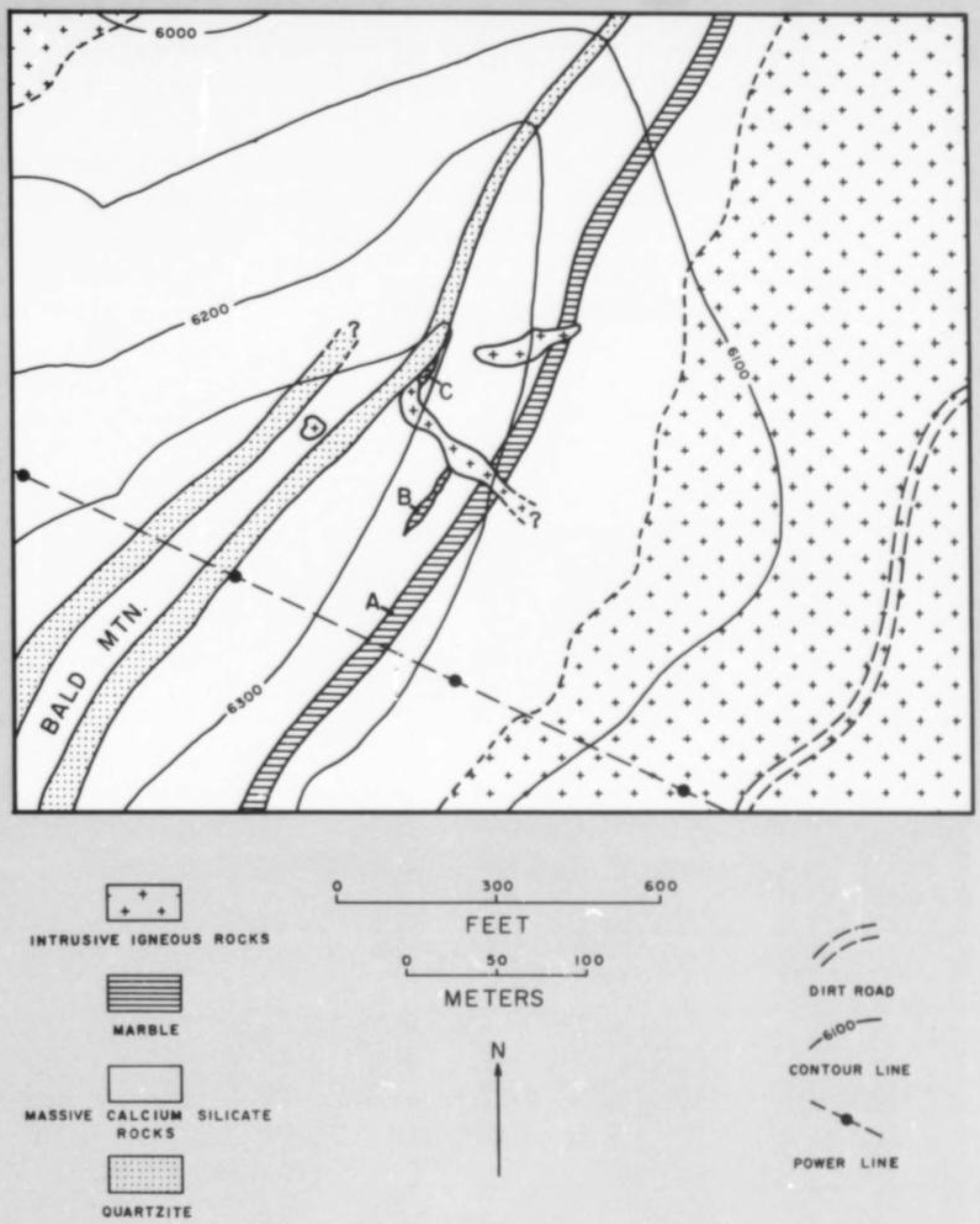

Figure 2. **Detailed geologic sketch map of the Bald Mountain area.**

flows and fragmental rocks. Soon thereafter, in Late Cretaceous and Early Tertiary time, huge volumes of magma genetically related to the earlier volcanics moved upward and outward into the Belt, Paleozoic, and Mesozoic sequences, shouldering aside large blocks of the pre-existing rocks while intensely heating and metamorphosing them. Impure Paleozoic limestones and dolomites were particularly susceptible to metamorphism and reacted and recrystallized to produce classic skarn assemblages. Multiple intrusive pulses formed many genetically related but texturally and compositionally distinct plutons collectively known as the Boulder batholith. Near the southern end of the batholith three large masses of Precambrian and Paleozoic rocks were caught between the Rader Creek granodiorite pluton and the slightly younger Butte quartz monzonite pluton (Fig. 1). The resulting discontinuous belt of near vertical metasedimentary rocks is known as the Rader Creek screen (Smedes *et al.*, 1968). At the present level of erosion in the Bald Mountain area, the metasedimentary screen is all that remains of the thousands of meters of sedimentary and volcanic rocks which once blanketed the region.

Metasedimentary rocks in the Bald Mountain segment of the Rader Creek screen consist predominantly of massive calc-silicate rocks with lesser amounts of calc-silicate marble, pure marble and quartzite (Fig. 2). These rocks are surrounded and crosscut by intrusive rocks of the batholith. Skarn minerals occur throughout most of the metamorphic rocks, but particularly well-formed crystals are found in the blue marble units on Bald Mountain (Figs. 2 and 3, units B and C). Locally, the blue marble has been dissolved by surface waters, leaving many isolated diopside crystals in the soil. The white marble of unit A (Fig. 2) is very pure and does not contain skarn minerals.

MINERALOGY

Diopside. Diopside is the most abundant mineral occurring in well-formed crystals in the calc-silicate marbles. Crystals as much as five cm long but averaging one to three cm long are found throughout marble units B and C (Fig. 2). The dark green, transparent to translucent crystals are invariably elongate parallel to crystallographic *c*. More than 90% of the 250 crystals studied are twinned parallel to (100) (Figs. 4A, 4B, 4C) but a few percent also have

Figure 3. **Bald Mountain viewed toward the west. Letters correspond to Fig. 2.**

twin planes perpendicular to *c* (Fig. 4D). The forms noted are: $a\{100\}$, $c\{001\}$, $m\{110\}$, $p\{\bar{1}01\}$, $u\{111\}$, $s\{\bar{1}11\}$, $v\{221\}$, $o\{\bar{2}21\}$, and $x\{\bar{3}31\}$.

Grossular. Crystals of grossular are much less common on Bald Mountain than those of diopside. The grossular crystals are as much as three cm across and are closely intergrown with diopside, calcite, and apatite. Most of the grossular is the classic cinnamon-colored variety but massive white grossular was noted at locality C (Fig. 2). Semi-quantitative X-ray fluorescence shows the white grossular to be very low in iron compared with the cinnamon variety. A trace amount of yttrium in the cinnamon variety was absent in the white grossular. Two crystal forms have been noted: $d\{100\}$, and $n\{211\}$ (Fig. 5).

Apatite. Prismatic, yellow apatite crystals up to three cm long occur closely intergrown with grossular, diopside and blue calcite. The roughly-formed, opaque crystals generally show hexagonal prisms and rarely have complete terminations (Fig. 6). Two crystal forms have been noted: $m\{10\bar{1}0\}$, and $x\{10\bar{1}1\}$.

X-ray fluorescence analyses show one apatite sample to contain 0.7 wgt % chlorine, 0.5 wgt % arsenic, 0.3 wgt % strontium, 0.1 wgt % uranium, and lesser amounts of thorium and yttrium. The apatite, which has been found only in association with calcite, effervesces slowly in dilute hydrochloric acid and probably is a carbonate apatite.

Calcite (marble). Calcite occurs in three main units on Bald Mountain (Fig. 2, units A, B, and C) and in many smaller unmappable units. The calcite from units B and C is a deep sky-blue color which forms a striking matrix for crystals of diopside, grossular and apatite. However, the thicker and more continuous marble in unit A is white throughout the Bald Mountain area, even immediately adjacent to the crosscutting intrusive igneous rocks (Fig. 2). X-ray fluorescence reveals that the blue marbles from units B and C contain 0.7 to 4.3 wgt % strontium whereas the white marble in unit A contains negligible amounts. No other impurities (atomic nr. >13) were detected in either the blue or the white marbles, suggesting that the strontium is responsible for the blue color in the calcite. The presence of strontium in marble units B and C and the absence of the element throughout marble unit A probably reflect compositional differences in the original pre-metamorphic limestones.

The intensity of the blue color in the Bald Mountain calcite is sensitive to changes in temperature and to exposure by some wavelengths of electromagnetic radiation. Blue fades rapidly to a white or cream color when the calcite is heated above 230° C (Fig. 7). The blue color returns within minutes in samples irradiated by X-radiation or short wavelength ultraviolet radiation and partly returns after several weeks in calcite which is exposed to direct sunlight. Blue color has not returned in control specimens more than six months after heat treatment. Naturally white marble from unit A (Fig. 2) shows no color change when exposed to X-radiation or ultraviolet radiation although some luminescence occurs.

Epidote. Clusters and semi-radial aggregates of dark yellow-green epidote crystals occur sparingly in the Bald Mountain areaa. These crystals, which measure up to 10 cm long, generally are found at the contact between the igneous and metamorphic rocks. In places the epidote occurs in a matrix of quartz, feldspar, actinolite, and sphene, an assemblage which probably represents a phase of the intrusive rocks contaminated by the limestone country rocks.

Epidote crystals on Bald Mountain are elongate parallel to crystallographic *b* and commonly have deeply striated faces in the [010] zone (Fig. 8). Crystals generally are twinned parallel with (100) (Fig. 9). The following forms have been noted: $a\{100\}$, $c\{001\}$, $r\{\bar{1}01\}$, $x\{\bar{1}02\}$, and $l\{\bar{2}01\}$.

ACCESS

Bald Mountain is located approximately 12 miles (19 km) southeast of Butte, Montana, in sections 34 and 35, T. 2N., R. 6 W. The locality can be reached by traveling five miles (8 km) southeast from Pipestone Pass on U.S. Highway 10 to the Toll Mountain campground turn off, and then proceeding 5 miles north-northeast on dirt roads to the base of Bald Mountain (Figs. 1,2,3). The land is owned and administered by the National Forest Service (Section 34) and the Bureau of Land Management (Section 35). Adjoining private properties should be strictly avoided.

ACKNOWLEDGEMENTS

The writer wishes to thank Kenneth Moser and William Phillips for their assistance with X-ray, optical, and time-temperature analyses and John S. White, Jr. for reviewing the manuscript.

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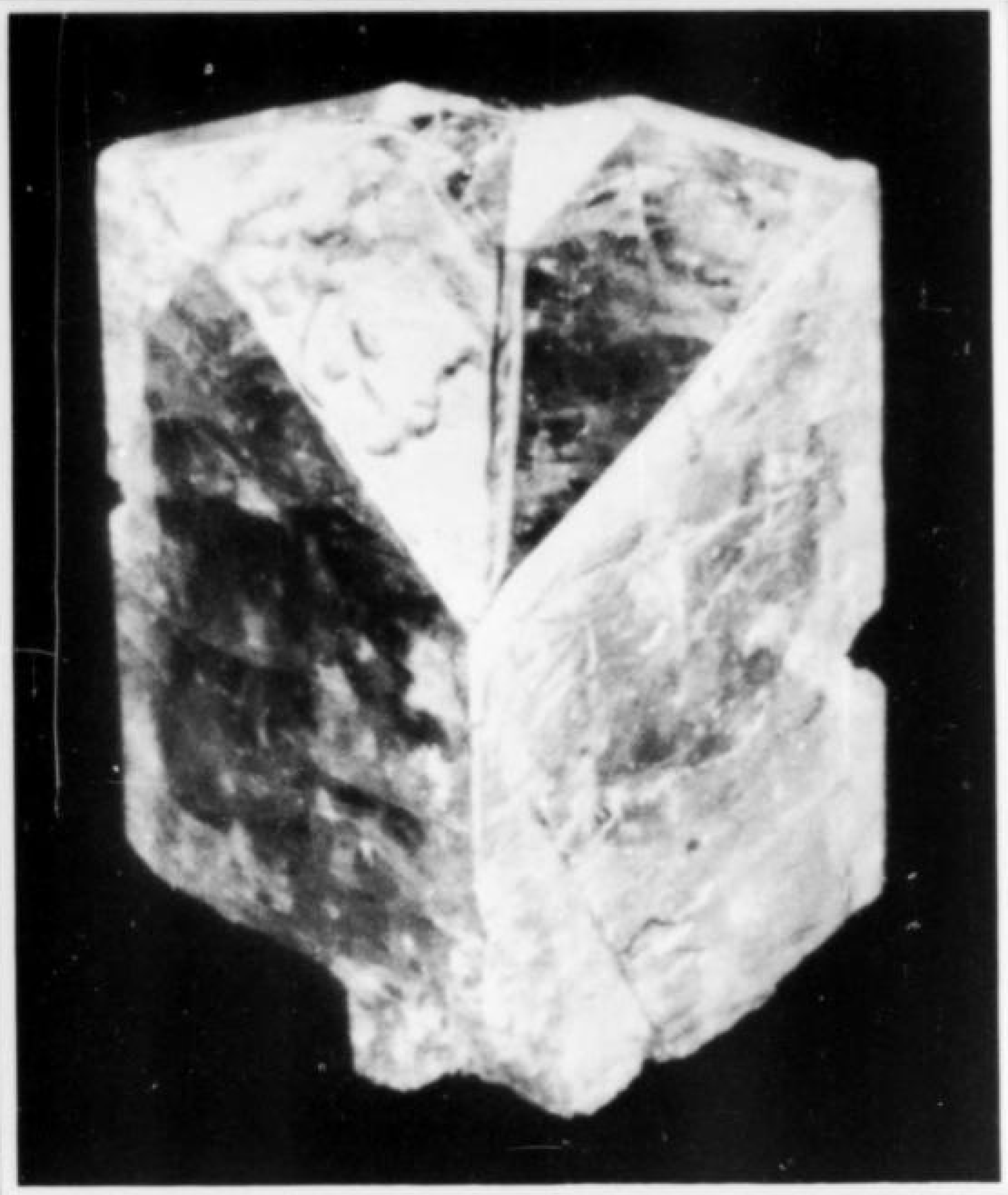
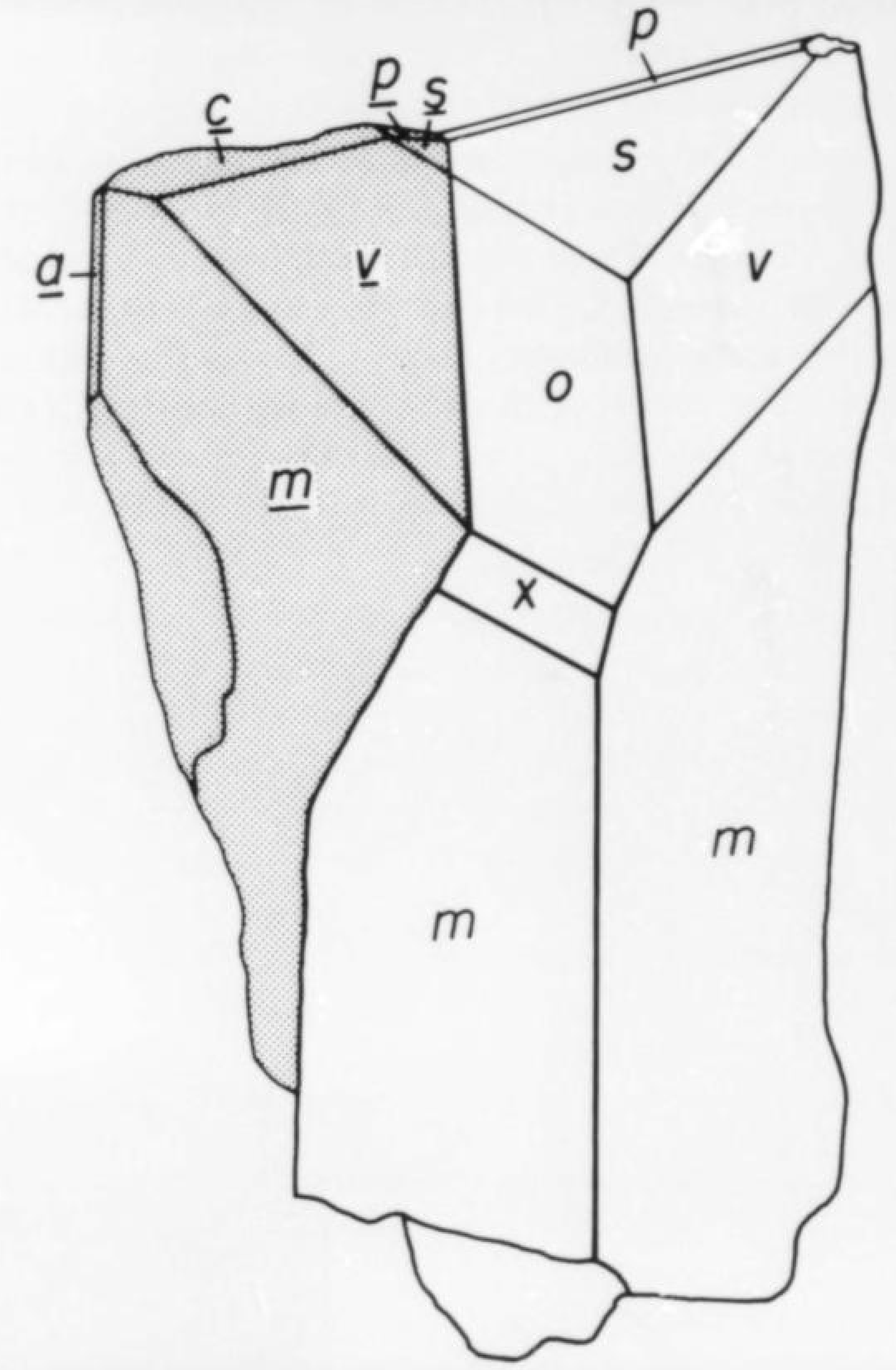
TILLING, ROBERT I. (1973) Boulder Batholith, Montana: A Product of Two Contemporaneous but Chemically-Distinct Magma Series. *Geol. Soc. Amer. Bull.* **84**, 3879-3900.

Figure 4. Diopside, Bald Mountain. The length of each crystal is as follows: A, 1.5 cm; B, 1.0 cm; C,1.3 cm; D, 2.5 cm. Shaded areas represent twinned parts of the crystals.

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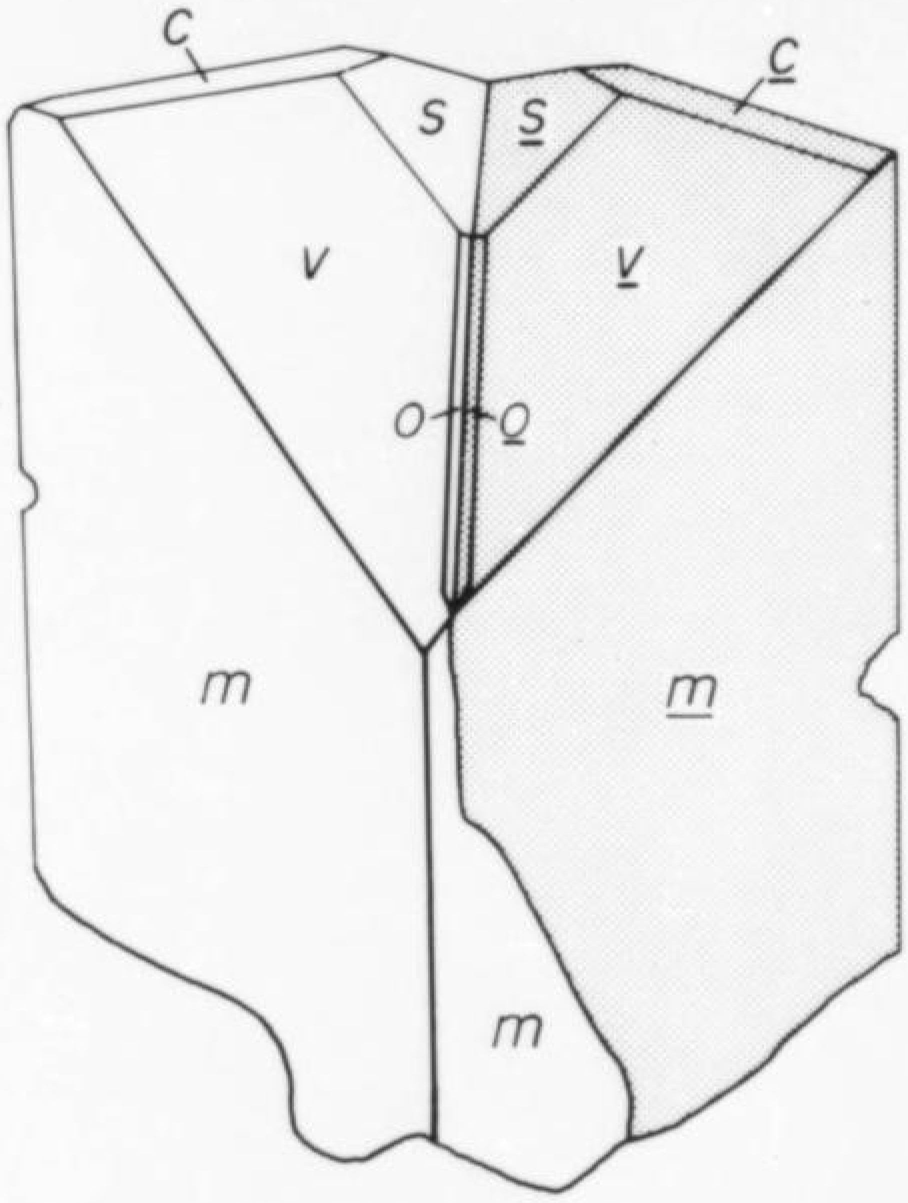
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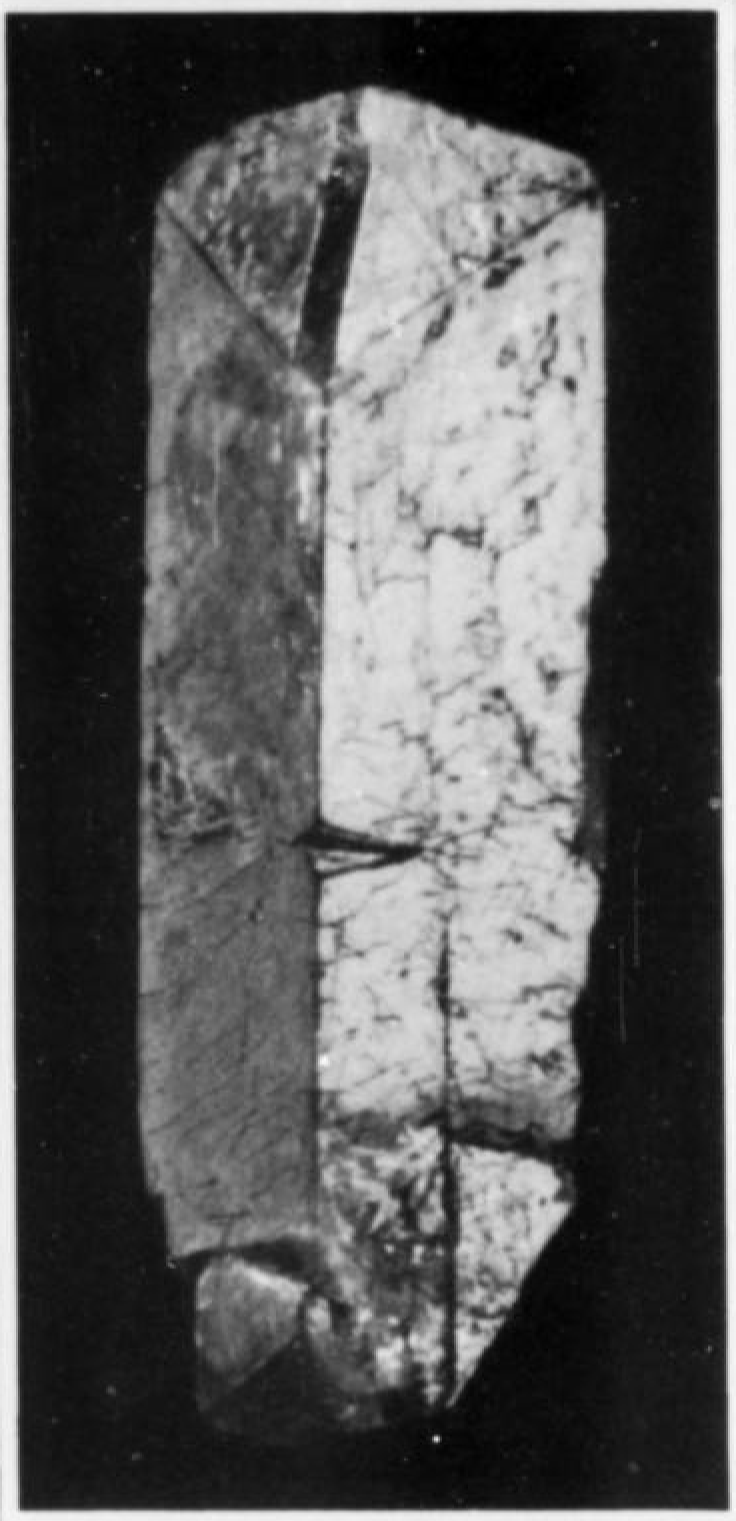


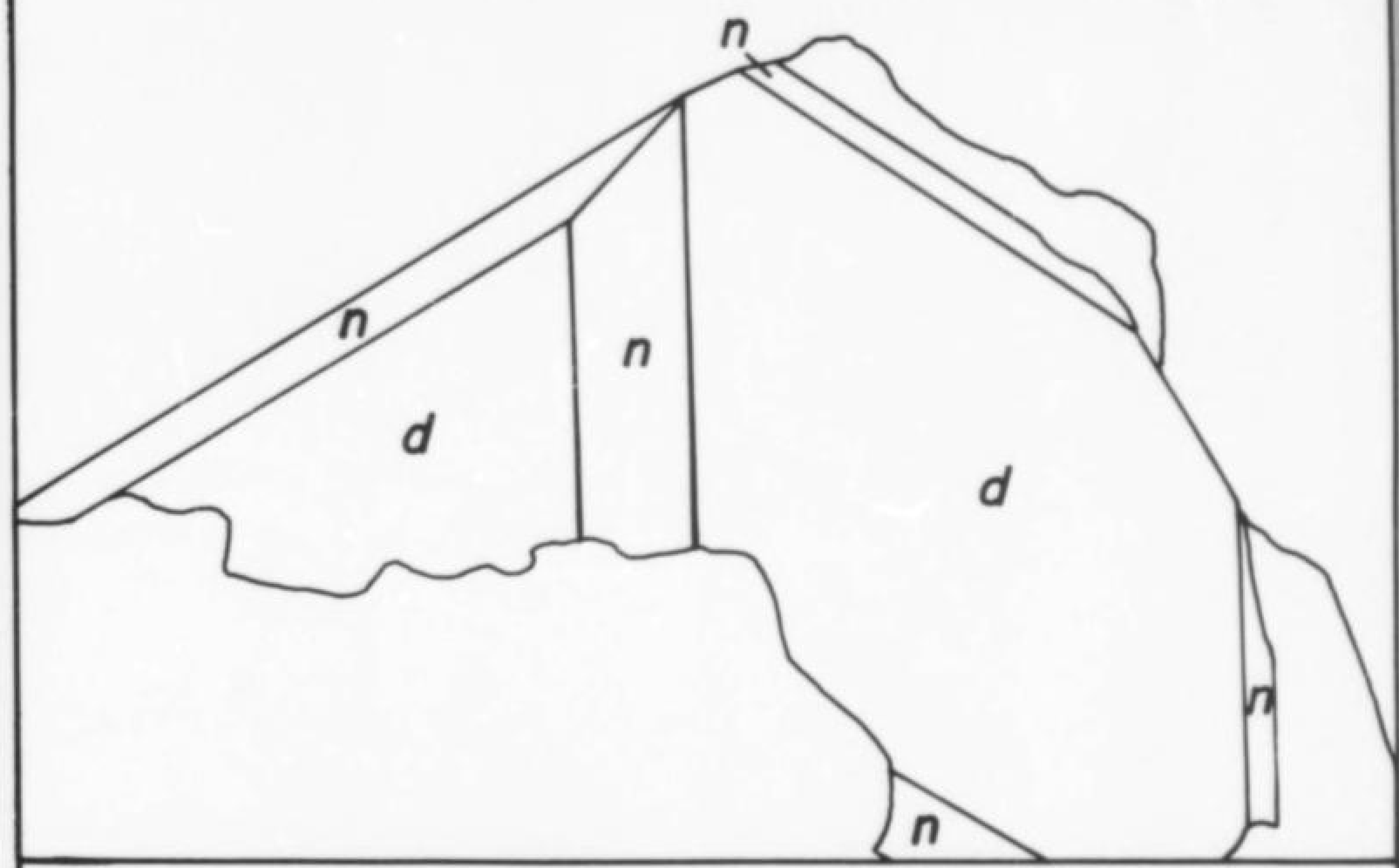
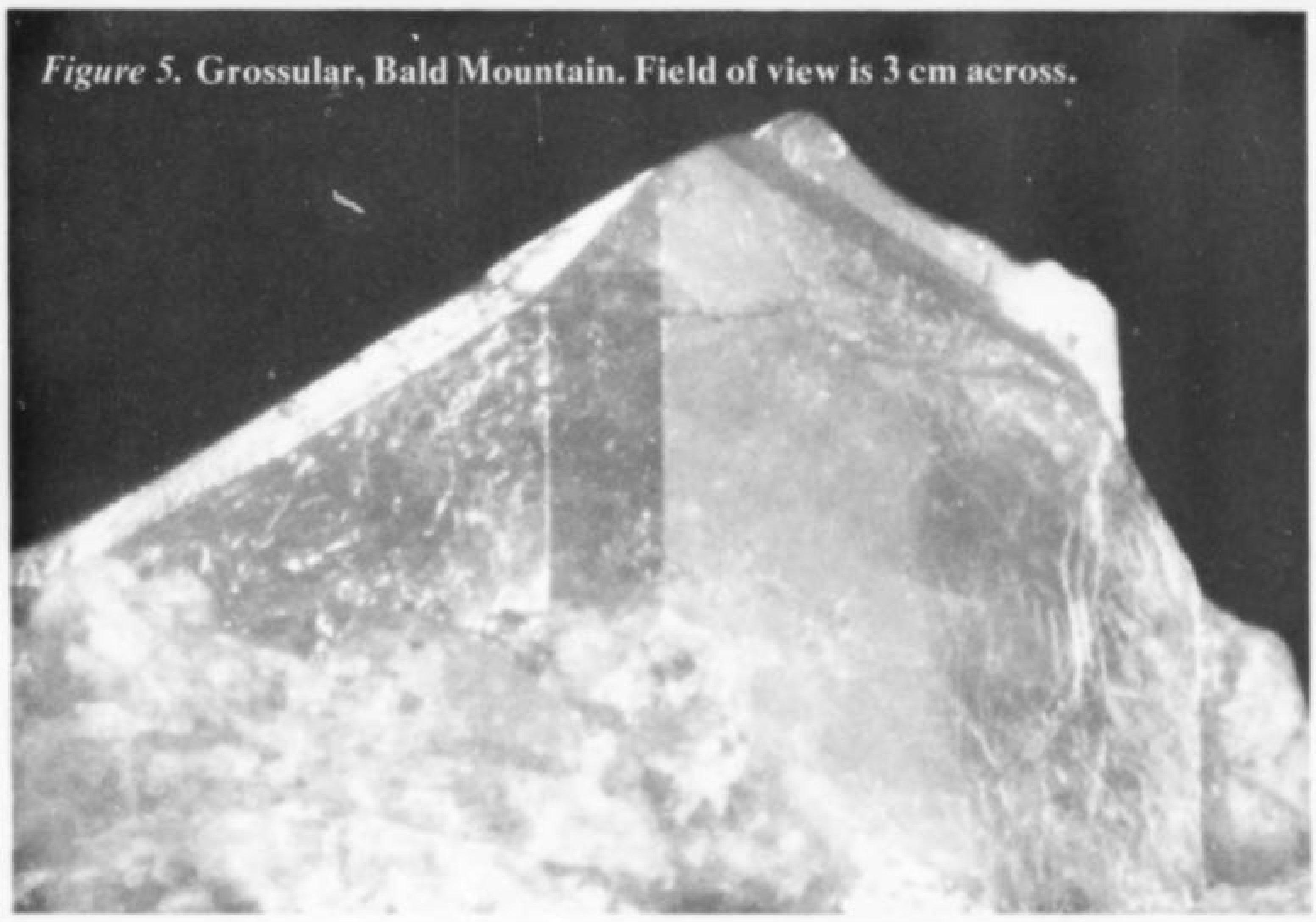
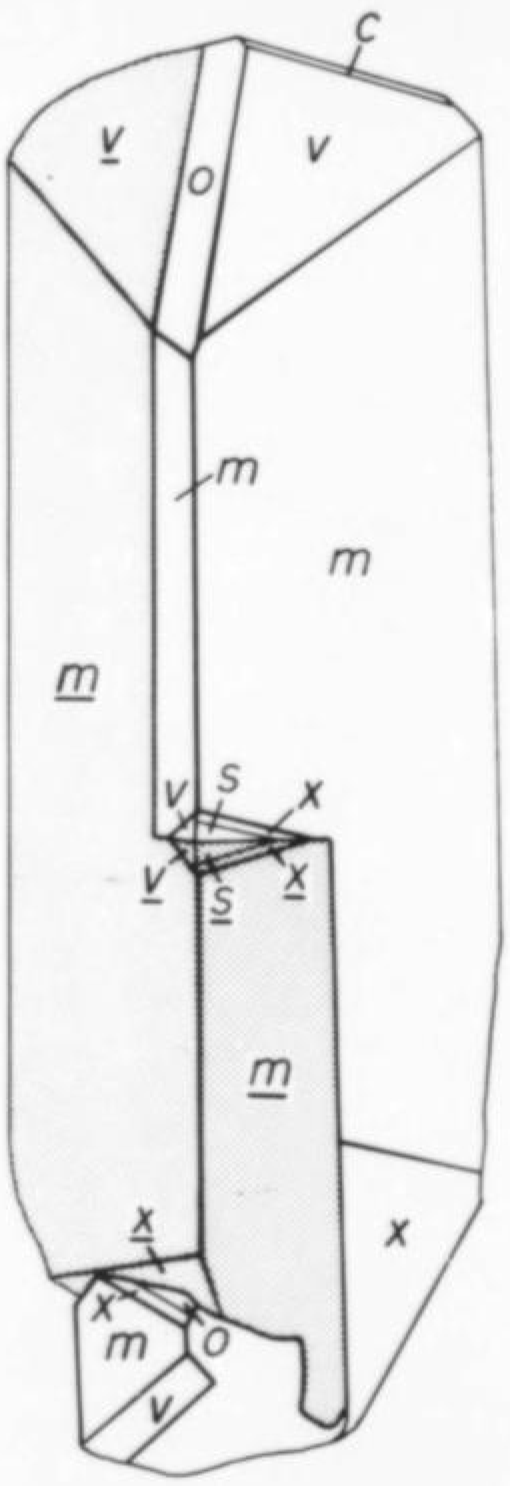


Figure 5. Grossular, Bald Mountain. Field of view is 3 cm across.





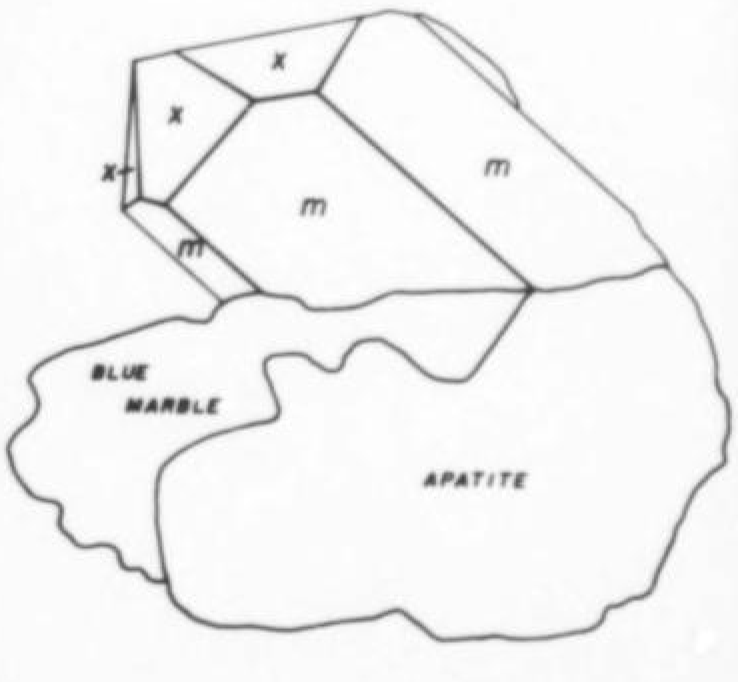


Figure 6. Apatite, Bald Mountain. Crystal is 3 cm long.

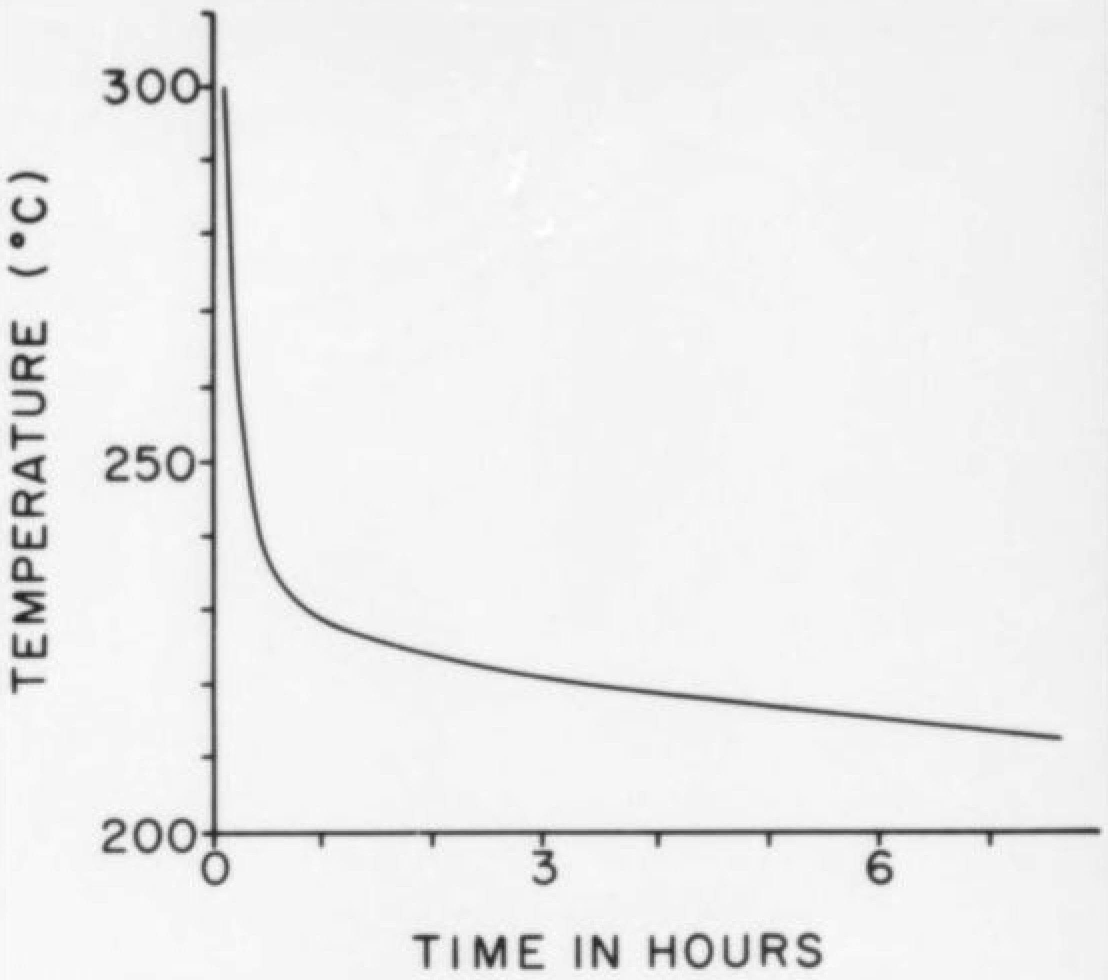


Figure 7. **Graph showing the minimum time required at various temperatures to change 2 mm-thick fragments of Bald Mountain calcite from blue to white.**

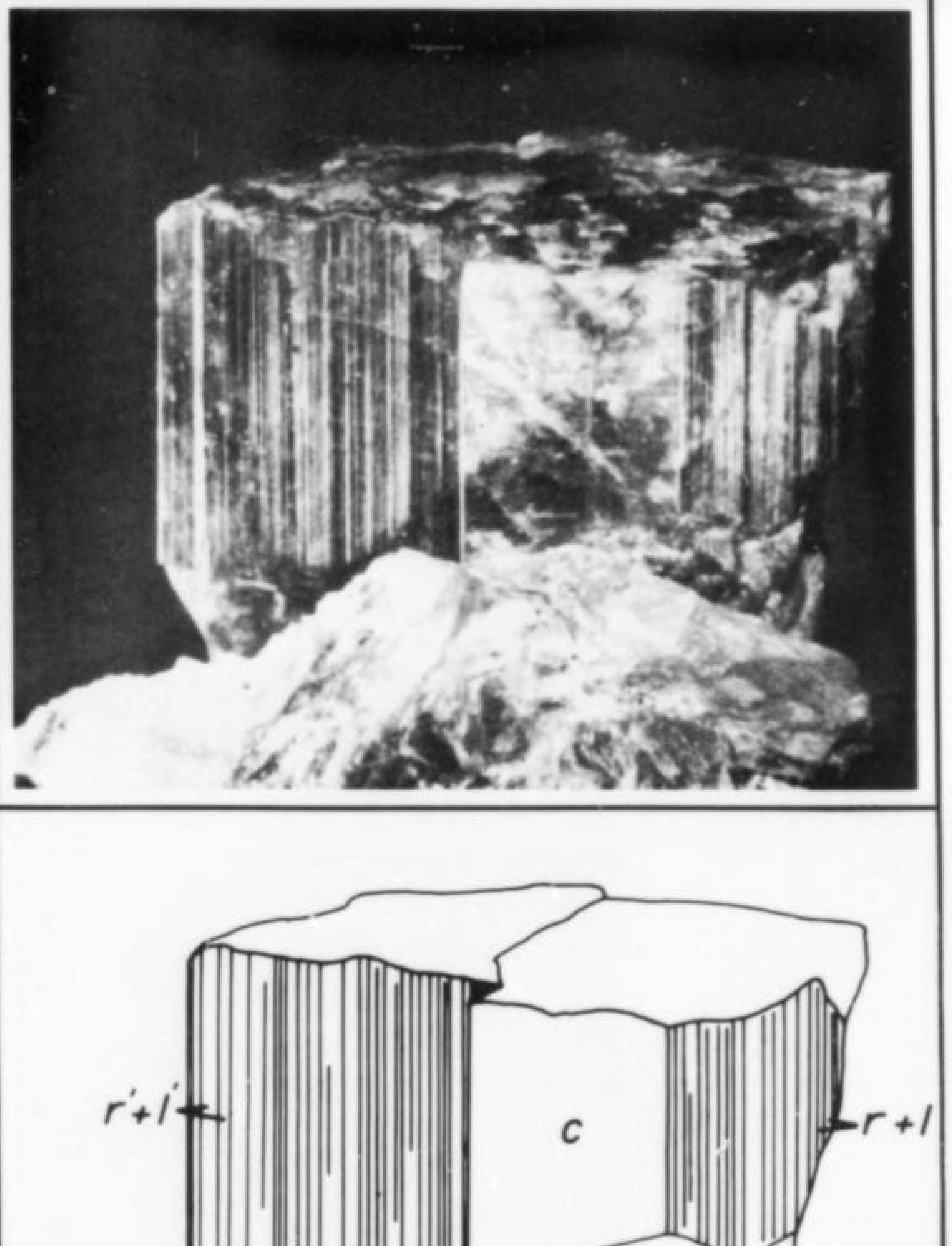


Figure 8. **Intergrown epidote crystals, Bald Mountain. The intergrowth is 2 cm wide.**

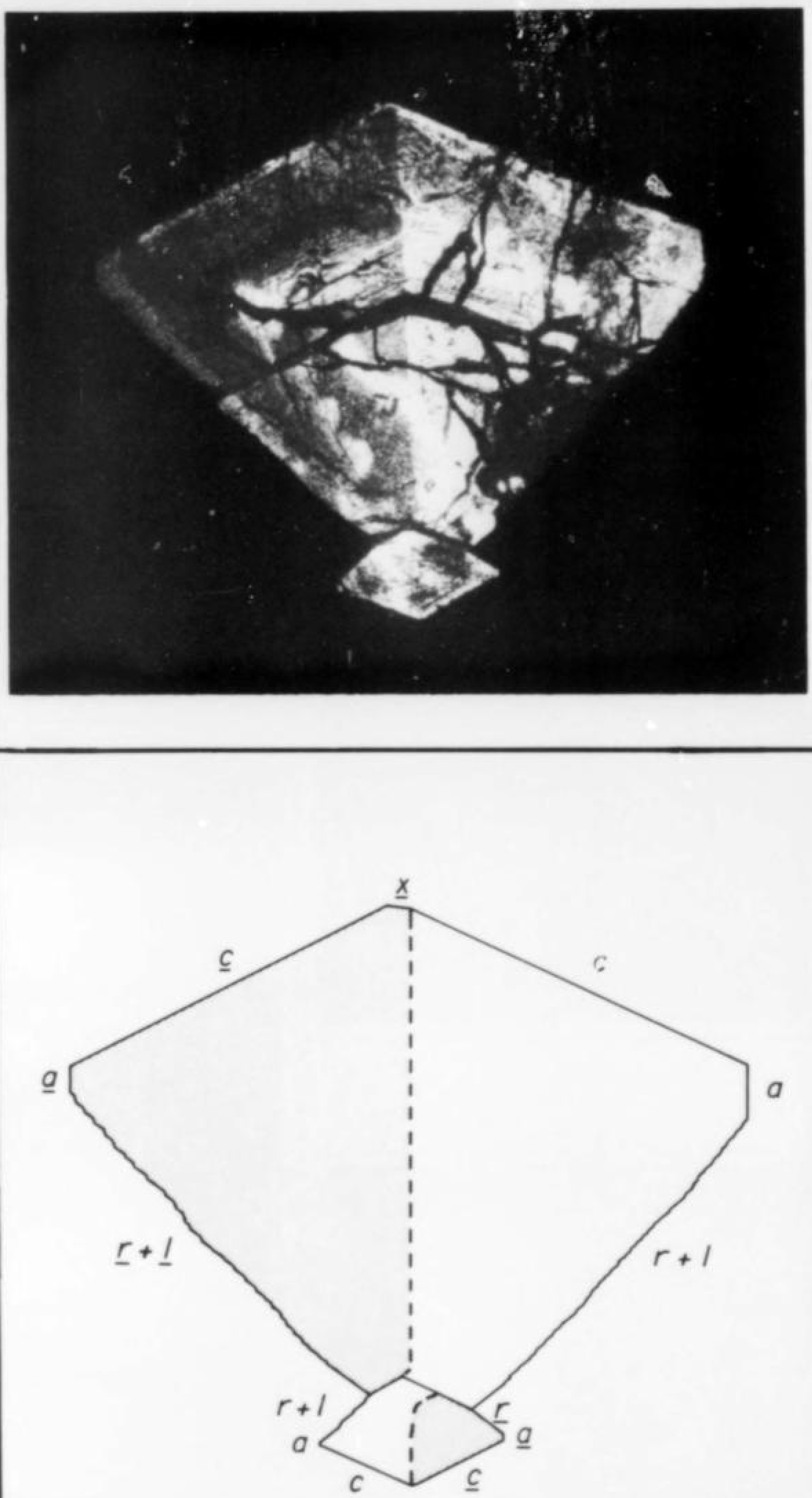


Figure 9. **Thin section of a twinned epidote crystal viewed perpendicular to the *b* axis under crossed polars. Note well-defined twin plane paralled to *a*, growth zones, and (001) cleavage (paralled to *c*). Dark vein-like areas are fracture and cleavage surfaces which totally reflect the transmitted light. Crystal is 1 cm across. Shaded areas represent twinned parts of the crystal.**

Famous Mineral Localities
Broken Hill, Australia

by Brian Mason
Smithsonian Institution, Washington, D.C.

Broken Hill, Australia, is a classic locality on all counts - variety of minerals, discovery of new species, richness of the ore deposits - and has also played an important role in the history and development of Australia. Situated in the desert interior and subject to high summer temperatures and long periods of drought, Broken Hill, following its discovery in 1883, rapidly became and has remained one of the largest interior cities of Australia. The original mining company, The Broken Hill Proprietary (generally known as BHP), is now the largest industrial concern in Australia; although it ceased mining at Broken Hill many years ago, the profits of that operation provided the foundation for its future growth.

The discovery of Broken Hill is linked with one of Australia's greatest explorers, Captain Charles Sturt. In 1844 Sturt left Adelaide at the head of a party of 16 men on a great journey that would take him to the then unknown center of the vast continent. He followed the Murray and Darling Rivers to the point now known as Menindee, and then struck northwest into the unknown. On October 24, 1844, about 70 miles beyond Menindee, he wrote:

> "At about three miles we passed a very remarkable and perfectly isolated hill, about 150 feet in height. It ran longitudinally from south to north for about 350 yards, and was bare of trees or shrubs, with the exception of one or two casuarinas. The basic of this hill was a platy ferruginous rock, and protruding above the ground along the spine of the hill there was a line of the finest hepatic iron ore I ever saw; it laid in blocks of various sizes, and of many tons weight piled one upon the other, without a particle of earth either on their faces or between them. Nothing indeed could exceed the clean appearance of these huge masses. On ascending this hill and seating myself on the top of one of them to take bearings, I found that the compass deviated 37° from the north point, nor could I place any dependence on the angles I here took."

This is quoted by Roy Bridges in *From Silver to Steel* as a description of Broken Hill, and he states it was confirmed by a statement of Dr. John Harris Browne, surgeon to the expedition, in 1889. However, geologists familiar with the region believe this description is of a ridge of magnetite rock (now known as the Razorback) some ten miles east of Broken Hill. This seems more likely, since there is nothing to suggest that the Broken Hill gossan was magnetic.

In any event, almost forty years were to elapse before mining began there. By 1866 the Mount Gipps sheep station (ranch) had been established on Stephens Creek 9 miles to the north, and the name "Broken Hill" given to the 50,000-acre paddock surrounding a black rocky hill (the original hill had two summits with a break between them). In 1867 there was an abortive gold rush to the region, prospectors passing by this great deposit while looking for gold-bearing quartz veins; none were found, and many men died of thirst and starvation. In 1876 rich silver-lead ore was found at Thackaringa, about 20 miles west of Broken Hill, and in the early 1880's a number of small but rich silver deposits were mined in the surrounding district. Broken Hill itself, however, was derisively referred to as the "hill of mullock" (waste rock), and prospectors passed it by.

It remained for Charles Rasp, an employee of the Mt. Gipps station, lacking both knowledge and prejudice, to reveal the wealth of Broken Hill. The following account is given in the Annual Report of the Department of Mines of New South Wales for 1886:

> "In September, 1883, one Charles Rasp, who was then a boundary rider on Mount Gipps station, marked out an area of 40 acres, believing the enormous outcrop of manganese to be tin. On reaching the station at night, he informed Mr. M'Gulloch, the general manager of the station, also his mates, of what he had done, when it was then and there determined to form a small syndicate, consisting of seven persons, all station hands, each putting £ 70 into the venture. The first thing done was to apply for a mineral lease of the land taken up by Rasp, together with six other 40-acre blocks on the same line. These seven blocks now constitute the Broken Hill proper, and were originally applied for by the following persons: George M'Culloch, George Urquhart, Charles Rasp, James Poole, Philip Charley, David James, and George M. Lind. Work was soon commenced, and assays made for tin, but I need hardly say with no beneficial results. It was then decided to sink a shaft, and prospect for silver, which, by this time, had been proved to exist in the district. The country being hard, and the sinking not showing very encouraging prospects, coupled with the fact that the small amount of capital that had been subscribed was exhausted, caused some of the original shareholders to sell to others, Lind being the

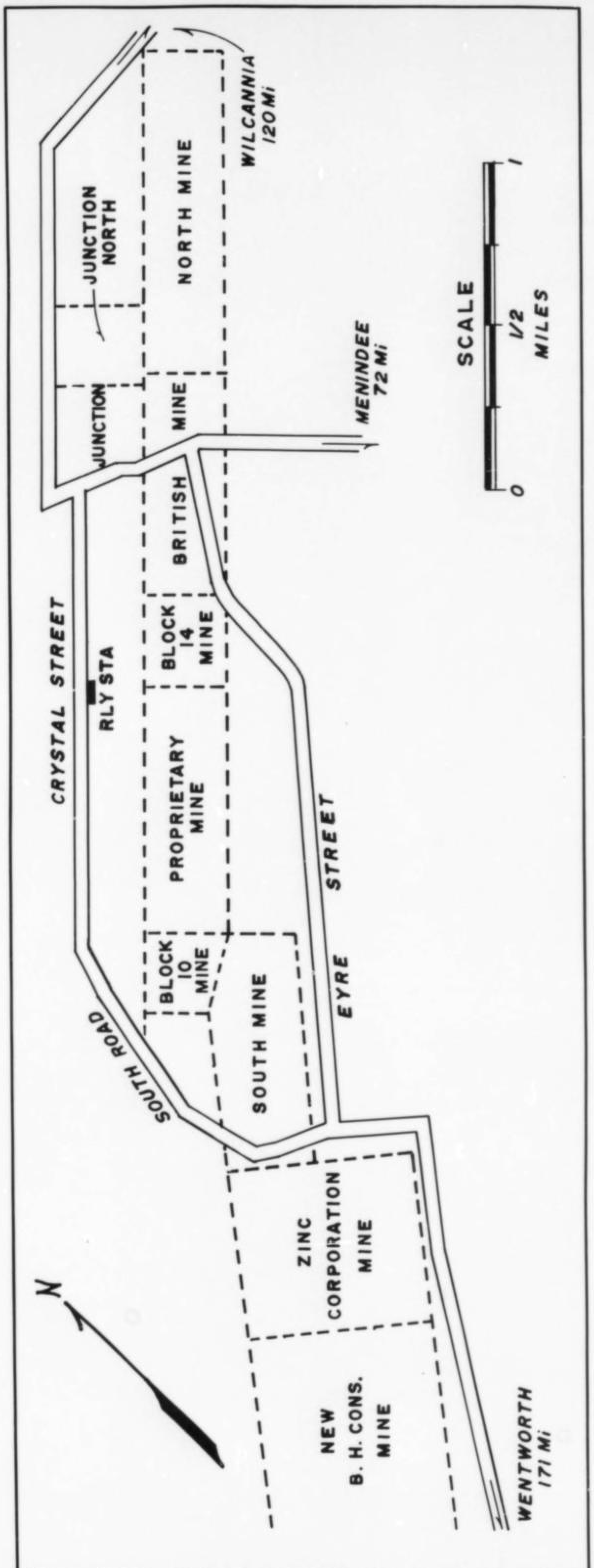


Figure 1. **Map of the Broken Hill area, showing locations of the different mines.**

first to retire, his interest being taken by M'Culluch and Rasp, Urquhart being the next to give in. It was now determined to increase the syndicate to fourteen, for the purpose of raising more funds for further prospecting. This arrangement was carried out, and the work continued until the latter part of 1884, when chlorides were first found in Rasp's shaft at a depth of about 100 feet. Shortly after rich chloride ore was found in the cap of the lode, at a different part of the mine."

The seven blocks taken up by Rasp and his companions were officially designated Mineral Leases 10-16, and became the property of the Broken Hill Proprietary Co. when it was organized in 1885. Within a few years this company split off parts of the property to other companies, and the individual mines were known as Block 10, Proprietary, or colloquially "Prop" (Blocks 11, 12, 13, the original Broken Hill, totally removed in the early mining), Block 14, and British (Blocks 15 and 16). Adjacent blocks were taken up and developed by other mining companies; at the north end of the lode the Junction (M.L.39), Junction North (M.L.40), and North (M.L.17,43) mines, and at the south the Central (M.L.9), South (M.L.7,8), the present Zinc Corporation (M.L.5,6), and New Broken Hill Consolidated (M.L.52). These are shown on the accompanying map (Fig. 1). The central part of the lode has now been worked out, but mining continues at each end in the North, Zinc Corporation, and New Broken Hill mines. The North mine now includes ML 15, 16, 39, and 40, and the South Mine ML9-14. An aerial photograph of the line of lode is reproduced as Fig. 2.

There was one mine at Broken Hill not on the lode itself. This was the Consols mine, situated about 1/2 mile east of the British mine. It was a vein with siderite gangue and dyscrasite (Ag_3Sb) as the principal ore mineral, occurring in masses of a ton or more, and was worked from 1890 to 1903, with a total output of 845,000 oz. silver and 20 tons lead. The isotopic composition of the lead is different from that of the lode mines, and therefore the Consols mineralization was probably quite independent; it may be part of the widespread silver-lead mineralization worked in numerous small mines in the surrounding district prior to and during the early days of the Broken Hill development.

The rapid development of the Broken Hill mines following the initial find is illustrated by the production figures for the early years (in pounds sterling; at that time £1 sterling was equivalent approximately to $5): 1885, £108,281; 1886, £370,423, 1887, £600,000; 1888, £1,001,848; 1889, £1,726,397; 1890, £2,628,536; 1891, £3,529,043. In less than ten years a city of 22,500 people, with handsome buildings fronting paved streets, lit by electricity, had grown up in the desert to serve the mines.

Geologically, the Broken Hill lode occurs in a terrain of high-grade metamorphic rocks of Precambrian age; lead isotope dating of galena from the ore gives an age of about 1600 million years. Lithological banding in varying

Figure 2. **Aerial photograph of Broken Hill area, looking northeast along the lode; the individual mines are: a, New Broken Hill Consolidated; b, Zinc Corporation; c, South; d, North. Note how the city of Broken Hill is divided in two parts by the mines along the lode. Broken Hill itself lay between c and d and has been completely removed by the mining.**

degrees is visible in most of the metamorphic rocks, and it is generally agreed that, in the main, they were originally sandy to clayey sedimentary rocks, metamorphosed to gneisses, schists, granulites, and quartzites, containing mainly sillimanite, almandine, staurolite, hornblende, muscovite, biotite, quartz, and feldspar. Amphibolites, probably metamorphosed basaltic sills, also occur in the sequence. Interesting mineralogically is the occurrence of the barium feldspar celsian in gneiss horizons near the southern and northern ends of the lode.

The Broken Hill lode actually consists of at least six ore horizons, as enumerated in Table 1, in what is believed to be a stratigraphic sequence. Sphalerite and galena are the dominant sulfide minerals in all the ore horizons, with subordinate amount of pyrrhotite, chalcopyrite, and loellingite. Of the lead lodes, No. 2 lens is the largest and most important ore producer in the southern end of the field, having supplanted No. 3 lens, which predominates in size and grade at the northern end. In the New Broken Hill Consolidated mine, No. 3 lens diminishes in size and merges with No. 2 lens. The four zinc lodes are stratigraphically above No. 2 lens, and are enclosed in a broad zone of predominantly siliceous, garnetiferous rocks with scattered gahnite and sulfide mineralization. The zinc lodes first become economic in the Zinc Corporation mine and increase in size and intensity of mineralization to the south. Table 1 shows that the concentration of lead and silver in the ore diminishes from No. 3 lens upwards, i.e., from north to south along the lode. This is reflected in the assay values for the different mines (1969 figures):

Mine	Ore production (tons)	% Pb	% Zn	oz Ag/ton
North	505,587	13.3	10.7	7.4
South	211,800	10.3	9.7	6.5
Zinc Corp.	874,913	11.6	9.7	3.0
New Broken Hill	1,105,287	7.8	16.1	1.8

Thus the North mine, with less than half the ore production of the New Broken Hill mine, yielded 3,581,719 oz silver in 1969 to 1,686,602 oz for the latter mine.

As mentioned above, the primary ore minerals are sphalerite and galena. The sphalerite is the black iron-rich variety known as marmatite; analyses of zinc concentrates show the average Fe content ranging from 7-12%; manganese is also present, in amounts up to 2.4%. The silver is probably present largely as microscopic inclusions of silver minerals rather than in atomic substitution for lead in galena. Silver-bearing minerals recorded from the ore include dyscrasite, tetrahedrite, pyrargyrite, and argentopyrite. A variety of sulfides have been identified. Minor minerals, widespread in small quantities, are pyrrhotite, marcasite, chalcopyrite, arsenopyrite, and loellingite; rare sulfides, microscopic or localized in occurrence, are tetrahedrite, gudmundite, cubanite, molybdenite, cobaltite, pyrite, alabandite, meneghinite, stannite, willyamite, ullmannite, linnaeite, breithauptite, nickeline, bornite, mackinawite, bournonite, boulangerite, jamesonite, and berthierite. Native gold, antimony, magnetite, wolframite, and scheelite have also been recorded in the ores.

The characteristic gangue mineral by which Broken Hill ore specimens can often be identified is a beautiful rose-red rhodonite, sometimes as transparent crystals up to an inch or more long. However, the gangue contains a variety of manganese-bearing silicates, including pyroxmangite, bustamite, pyroxenes on the hedenbergite-johannsenite join (usually referred to as manganhedenbergite, or in the earlier literature on Broken Hill as "green rhodonite") and manganoan wollastonite. Fine pale pink to buff crystals of bustamite, and dark green crystals of manganhedenbergite, have been found. Spessartine is abundant and widespread; sharp dark red dodecahedral crystals up to an inch or more are known, and large amounts of friable granular material (referred to as garnet sandstone) are present in the lode. Manganese olivines - tephroite and

Table 1
Characteristics of the six ore horizons

Orebody	Designation	Pb (%)	Typical assay Ag (oz/ton)	Zn (%)	Principal gangue minerals
B lode (previously Siliceous Zinc lode)	Zinc lode	5	1	20	Quartz
A lode (previously Rhodonitic Zinc lode)	Zinc lode	4	1	16	Quartz, garnet, rhodonite, manganhedenbergite
Upper No. 1 lens	Zinc lode	8	1	20	Quartz, calcite
Lower No. 1 lens	Zinc lode	8	1	20	Quartz, calcite
No. 2 lens	Lead lode	20	4	14	Calcite, rhodonite, bustamite, quartz
No. 3 lens	Lead lode	15	11	18	Quartz, fluorite, rhodonite

knebelite (ferroan tephroite), - are of rarer occurrence, although a large amount of massive tephroite has been found in the New Broken Hill mine. Roepperite, a supposed zincian tephroite, has been recorded, but all specimens I have analysed with the microprobe are uniformly low ($<1\%$) in ZnO, the zinc being present as minute inclusions of sphalerite. Small amounts of dannemorite (manganoan grunerite) have been recorded. The rare mineral pyrosmalite, $(Mn,Fe)_8Si_6O_{15}(OH,Cl)_{10}$, is a widespread though very minor mineral in the manganese silicate gangue; some fine hexagonal crystals have been found in vugs and post-lode fissures. Fine specimens of inesite, $Ca_2Mn_7Si_{10}O_{28}(OH)_2 \bullet 5H_2O$, usually as sheaf-like aggregates of single crystals, have been found in cavities and veins. Sturtite, a black glassy hydrated manganese silicate, isotropic and amorphous to X-rays, is not uncommon as an alteration product.

Besides the manganese silicates the common gangue minerals are quartz, calcite, and fluorite (pink, gray, buff, and purple). Pods and lenses of quartz and orthoclase, referred to as pegmatites, are present throughout the ore body. Some of this orthoclase is translucent to transparent, with a striking pale green to emerald green color; the color may be caused by lead in the structure, since analyses show up to 1.19% PbO, an anomalously high content for feldspar. Minor gangue minerals include apatite, gahnite, and vesuvianite. Fine specimens of apophyllite, some with pyramidal crystals up to an inch on edge, have been found in vugs.

Although many fine and mineralogically interesting specimens occur in the primary orebody, the fame of Broken Hill undoubtedly rests on the richness and variety of the oxidized zone. The outcrop itself evidently consisted largely of coronadite and other manganese oxide minerals, but at no great depth the gossan was a mineral collector's dream of secondary lead, silver, and copper minerals. Judging from early descriptions, the primary unaltered ore was usually met with at depths of 200′-400′ from the surface, although locally the oxidized zone extended much deeper. It appears that the oxidized zone passed into the primary ore without an extensive secondary sulfide zone, although secondary sulfide minerals have been recorded - chalcocite, covellite, argentite, acanthite (a mass of acanthite weighing some 70 lb. was found in the 350′ level of the South mine), jalpaite, stromeyerite, secondary galena, and secondary white sphalerite.

Much of the oxidized zone was mined out in the early years, but small portions of it remained accessible until recently. In 1958 I was taken into the upper levels of the South mine from the bottom of the old open cut, and saw the silver halides in place (and smelt them, too - iodyrite readily decomposes into silver and iodine, and the characteristic reek of iodine pervaded the stopes). At that time good specimens of many of the secondary minerals could be obtained from the miners. However, since 1960 mining has been entirely in the primary ore, which is crushed and separated by flotation into a zinc concentrate and a lead concentrate, which are railed to the coast for smelting.

The most comprehensive account of the secondary minerals of Broken Hill is George Smith, "A contribution to the mineralogy of New South Wales" (*New South Wales Mines Dept., Bull.* **34**, 1926). George Smith began his career as ore buyer and assayer at Broken Hill in 1888, was manager of the Consols mine, and then Inspector of Mines for twenty-one years. He thus had excellent opportunities to collect and study these minerals, and his acute observations are a mine of information. Colonel Roebling evidently corresponded extensively with George Smith, and the Roebling Collection in the Smithsonian Institution contains many Broken Hill specimens obtained from Smith, including the type specimen of willyamite. The following account of the oxidized minerals is largely based on George Smith's monograph, supplemented by more recent data.

Native elements recorded are silver, copper, gold, and sulfur. Of the latter two, gold usually occurred only as microscopic grains, and Smith mentions sulfur as occuring in small rounded crystals with cerussite from the Consols mine. The finest specimens of native silver came from the Consols mine, as masses of loose wire-like crystals, but good specimens were also found in mines on the main lode. Much of the native silver, however, was finely disseminated in other minerals, such as limonite and kaolin. Native copper was common in a variety of forms, wire-like and arborescent masses being most usual. Crystals (octahedra and dodecahedra) can be distinguished on some specimens.

The halides are perhaps the most noteworthy of the secondary minerals. Not only was Broken Hill probably the largest deposit of silver halides ever mined, but it is the type locality for miersite (cubic AgI) and marshite (CuI). Most of the silver halide material was embolite (bromian chlorargyrite, Ag(Cl,Br), but iodyrite was not uncommon; the remaining halides - miersite, marshite, nantokite, tocornalite, and boleite - were rare; a doubtful species, coccinite, believed to be mercuric iodide, has also been recorded. Recent investigation has shown that the Broken Hill embolite has a rather limited composition range (in mole percentages): AgCl 56.7-77.0, AgBr 20.0-34.1, AgI 0.0-11.6). George Smith commented that increasing AgI in embolite resulted in a yellowing of the characteristic green color. He noted that the Consols mine had the purest examples and the largest quantities of chlorargyrite; some cheese-shaped masses were up to a foot in diameter and three or four inches thick, with a clear translucent green color, and assayed up to 73.1% Ag (pure AgCl contains 75.3%).

The presence of large amounts of iodine in the Broken Hill halides is a geochemical mystery. The source of the iodine is an enigma. It seems to be limited to the Broken Hill lode, since the many other silver halide occurrences in the region have been recorded as chlorargyrite. However, there is no obvious source of iodine in the primary minerals of the lode. The iodine may be of marine origin, since in the Tertiary period the sea flooded to within a few miles of the Broken Hill region.

Quantitatively, oxides in the form of "limonite" and "psilomelane" made up the major part of the oxidized zone. Mineralogically, the limonite consisted largely of geothite, but lepidocrocite has also been identified in small amounts. Psilomelane has been used as a general term for the black manganese oxide material, frequently occurring as beautiful stalactitic and botryoidal masses often coated with fine specimens of other secondary minerals. Mineralogically, the name psilomelane is now restricted to the barium manganese oxide, and much of the Broken Hill material is coronadite, the lead analog of psilomelane. Other manganese oxide minerals, such as pyrolusite, are probably present; Smith records the latter mineral as stalactitic clusters of small steel-gray crystals in the Consols mine. Chalcophanite, $ZnMn_3O_7 \cdot 3H_2O$, has been recorded lining small cavities and forming a velvet-like overgrowth on stalactitic psilomelane. Fine specimens of cuprite were collected in the oxidized zone, some well-crystallized in octahedra up to 1 cm across. Smith also records tenorite, as a black incrustation on the cuprite. Bindheimite, rich in silver, was found in the oxidized zone of the Consols mine. The minium specimens from Broken Hill which are present in many collections are all the product of mine fires, and thus not of truly natural occurrence.

Of the secondary carbonates, cerussite was the most abundant, the most varied, and in many respects the most beautiful. Fine examples can be seen in most large collections. There was a famous "pipe" of cerussite in the Central mine, which extended to the 600′ level; it was approximately 50′ in diameter, and on the 600′ level it is reported that a cavern 25′ x 40′ existed. The mineral was, however, abundant throughout the oxidized zone, and was the principal lead ore in the early days. Smithsonite was much less abundant, but many choice specimens have been preserved, commonly being groups of crystals on stalactitic psilomelane. The crystals were almost colorless, or occasionally delicate shades of green (presumably due to the presence of copper). Malachite and azurite were common, the latter frequently in fine terminated crystals, sometimes an inch or more long. The malachite was usually massive and in mammillary forms, and sometimes as pseudomorphs after azurite. Hydrozincite has been recorded as white porcellaneous material replacing smithsonite, and aurichalcite has been found in association with malachite. Aragonite and calcite occurred in the oxidized zone, and Smith records the varieties strontianocalcite and zincocalcite. However, specimens of strontianocalcite he sent to Colonel Roebling contain no detectable strontium $<0.1\%$ Sr), and specimens of zincocalcite contain a maximum of 0.4% ZnO or are a mixture of calcite and smithsonite, so these varieties appear to be discredited. Dolomite is recorded as well-developed colorless to white rhombohedral crystals in the Proprietary mine, but Smith comments that it appeared to be a rather uncommon mineral at Broken Hill. Rhodochrosite, both as crystallized masses and in globular forms, has been recorded from several of the mines; kutnahorite has recently been identified. Siderite, as clusters of large flat rhombohedra coated with rhodochrosite, was found in the Junction North mine; it was an important gangue mineral in the Consols mine. Phosgenite is mentioned by Smith as occurring in one section of the Consols mine, as short stout tetragonal forms, colorless to yellow-white, and a good specimen is in the Roebling collection.

Relatively few sulfates - anglesite, linarite, brochantite, gypsum, goslarite - have been recorded from Broken Hill. Anglesite occurred in superb crystallizations; Smith records that in depth the crystals were larger and improved both in quality and quantity, the largest and most mag-

Table 2. Minerals of Broken Hill

A = country rock; B = gangue; C = primary ore; D = oxidized zone; E = Consols mine; an asterisk indicates that the mineral has usually only been observed microscopically

Name	Formula	Occurrence			
Elements			**Sulfides and Sulfosalts**		
Copper	Cu	D	Chalcocite	Cu_2S	D
Silver	Ag	D, E	Bornite	Cu_5FeS_4	C*, E
Gold	Au	C*, D	Acanthite	Ag_2S	D, E
Antimony	Sb	C*, E	Argentite	Ag_2S	D
Paradocrasite	$AsSb_3$	E	Stromeyerite	CuAgS	D
Stibarsen	AsSb	E	Jalpaite	Ag_3CuS_2	D
Graphite	C	B	Sphalerite	(Zn,Fe)S	C, D
Sulfur	S	D, E	Wurtzite	(Zn,Fe)S	C*
Allargentum	Ag_6Sb	D, E	Chalcopyrite	$CuFeS_2$	C, E
Dyscrasite	Ag_3Sb	C*, E	Stannite	Cu_2FeSnS_4	C*

nificent groups being found in the actual contact with the sulfide ores. Many specimens show fine crystals of anglesite on the surface of reticulated masses of cerussite. Most of the crystals were colorless or pale yellow, but some magnificent sherry-colored crystals were found in the Block 14 mine. Linarite in small clusters of azure-blue crystals was found in the British and Proprietary mines, but Smith notes that little was collected because it was thought to be azurite. Brochantite was found in very limited quantity. Gypsum, as the colorless transparent variety selenite, was found in the South mine. Goslarite, as stalactitic masses of a delicate coral-pink color, has been found in the shallow levels of the South mine.

Among the phosphates, arsenates, and vanadates, pyromorphite occupies first place. Many tons of this mineral were present in the oxidized zone, and it occurred in a variety of forms and colors. Much of it was massive, botryoidal, and mammillated, of a brown to gray color. Excellent crystal groups were found, ranging in color from pink to brown to gray. Canary-colored crystals occurred in the Block 14 mine, and greenish-yellow crystals principally in the Proprietary mine. Smith records that the only green pyromorphite came from the Consols mines. Mimetite, the arsenate analog of pyromorphite, also occurs at Broken Hill, but in much lesser amounts, in colorless to white to yellow crystals; Smith suggested that the white variety might be the calcium-rich form hedyphane, but this has not been confirmed. Campylite, a variety of mimetite in barrel-shaped crystals of deep red-brown color, was of rare occurrence. Other arsenates recorded from Broken Hill are scorodite, olivenite, erythrite, and chenevixite (the latter two from the Consols mine). Vanadinite has been noted in small amounts as yellow to orange-red hexagonal crystals lining vugs in the Proprietary mine and other mines on the lode, and also in the upper level of the Consols mine.

The small amounts of wolframite and scheelite in the primary ore evidently supplied the tungsten for the stolzite and raspite, dimorphs of $PbWO_4$, in the oxidized zone. Stolzite occurs in a variety of well-crystallized forms: small straw-yellow tetragonal plates, short thick smoke-gray prisms or double pyramids, large tabular white to brown crystals up to 1 cm across, bright yellow-red to red-brown tetragonal pyramids up to 2 cm long. Raspite is much rarer than stolzite; it was found as small tabular yellow-brown monoclinic prisms on gossan, sometimes together with stolzite. Wulfenite, the molybdate analog of stolzite, has been recorded as small clusters of orange-red tetragonal crystals from the Junction mine, the source of the molybdenum being presumably the molybdenite in the sulfide ore.

The only secondary silicates listed from the Broken Hill mines are "kaolin", chrysocolla, and hemimorphite. The kaolin (specimens in the Smithsonian collection were x-rayed and found to be kaolinite, not halloysite as sometimes labelled), occurred as large masses of white earthy material, often impregnated with silver halides; the material was sometimes black or reddish from intermixed manganese or iron oxides. Crystals of spessartine were thickly distributed though the kaolin in some areas, probably indicative of the high resistance of garnet to decomposition compared to the other silicates. Chrysocolla was found in several mines in small amounts, in amorphous masses and botryoidal forms of a distinctive turquois-blue color. Hemimorphite was of very rare occurrence; Smith reports that he knew of only two specimens, as small radiating clusters of colorless crystals on cerussite.

All large mineral deposits are to some degree unique, and Broken Hill is no exception. However, mineralogically it presents some interesting analogies with some other famous localities. The characteristic manganese silicate gangue invites comparison with Franklin, New Jersey, and Långban, Sweden. Neither of these deposits has, however, been subjected to the long period of weathering that pro-

Stibnite	Sb_2S_3	C, E
Tetrahedrite	$(Cu,Ag)_{12}Sb_4S_{13}$	C*, E
Cubanite	$CuFe_2S_3$	C*
Argentopyrite	$AgFe_2S_3$	C, E
Pyrrhotite	FeS_{1-x}	C, E
Nickeline	$NiAs$	C*, E
Breithauptite	$NiSb$	C*, E
Pentlandite	$(Fe,Ni)_9S_8$	C*
Mackinawite	FeS	C*
Millerite	NiS	C
Galena	PbS	C, D, E
Alabandite	MnS	C
Cinnabar	HgS	D
Covellite	CuS	D, E
Linnaeite	Co_3S_4	C*
Pyrite	FeS_2	A, C, E
Marcasite	FeS_2	C, E
Cobaltite	$CoAsS$	C, E
Costibite	$CoSbS$	E*
Paracostibite	$CoSbS$	E*
Willyamite	$(Co,Ni)SbS$	C*, E
Ullmannite	$NiSbS$	C, E
Loellingite	$FeAs_2$	C, E
Arsenopyrite	$FeAsS$	C, E
Gudmundite	$FeSbS$	C*
Molybdenite	MoS_2	C, E
Skutterudite	$CoAs_3$	C, E
Pyrargyrite	Ag_3SbS_3	C*, E
Proustite	Ag_3AsS_3	E
Stephanite	Ag_5SbS_4	E
Miargyrite	$AgSbS_2$	C*
Pyrostilpnite	Ag_3SbS_3	E

Polybasite	$(Ag,Cu)_{16}Sb_2S_{11}$	C*
Berthierite	$FeSb_2S_4$	C*
Bournonite	$PbCuSbS_3$	C*, E
Jamesonite	$Pb_4FeSb_6S_{1\cdot4}$	C*
Boulangerite	$Pb_5Sb_4S_{11}$	C
Meneghinite	$Pb_{13}CuSb_7S_{24}$	C
Kermesite	Sb_2S_2O	E

Halides

Chlorargyrite	$AgCl$	D, E
Bromargyrite	$AgBr$	D
Iodyrite	AgI	D, E
Miersite	AgI	D
Marshite	CuI	D
Nantokite	$CuCl$	D
Tocornalite	$AgHgI_2$?	D
Coccinite(?)	HgI_2	D
Fluorite	CaF_2	B
Boleite	$Pb_9Cu_8Ag_3Cl_{21}(OH)_{16}\cdot H_2O$	D

Oxides

Cuprite	Cu_2O	D
Tenorite	CuO	D
Gahnite	$ZnAl_2O_4$	B
Magnetite	Fe_3O_4	A, C, E
Jacobsite	$MnFe_2O_4$	B
Minium	Pb_3O_4	D (Fire product)
Hematite	Fe_2O_3	A
Ilmenite	$FeTiO_3$	A
Pyrophanite	$MnTiO_3$	B*
Bindheimite	$Pb_2Sb_2O_7$	E
Stibiconite	$Sb_3O_6(OH)$	E
Quartz	SiO_2	A, B, E
Rutile	TiO_2	B*
Anatase	TiO_2	B
Cassiterite?	$SnO._2$	C*
Pyrolusite	MnO_2	D, E
Coronadite	$Pb_2Mn_8O_{16}$	D
Psilomelane	$(Ba,H_2O)_2Mn_5O_{10}$	D
Goethite	$FeOOH$	D, E
Lepidocrocite	$FeOOH$	D
Chalcophanite	$ZnMn_3O_7\cdot 3H_2O$	D

Carbonates

Calcite	$CaCO_3$	B, D, E
Smithsonite	$ZnCO_3$	D, E
Siderite	$FeCO_3$	D, E
Rhodochrosite	$MnCO_3$	D
Kutnahorite	$CaMn(CO_3)_2$	B
Dolomite	$CaMg(CO_3)_2$	D
Aragonite	$CaCO_3$	D
Cerussite	$PbCO_3$	D, E
Azurite	$Cu_3(OH)_2(CO_3)_2$	D, E
Malachite	$Cu_2(OH)_2(CO_3)$	D, E
Hydrozincite	$Zn_5(OH)_6(CO_3)_2$	D
Aurichalcite	$(Zn,Cu)_5(OH)_6(CO_3)_2$	D
Bastnäsite	$CeFCO_3$	B*
Phosgenite	$Pb_2Cl_2CO_3$	E

Sulfates, Tungstates and Molybdates

Anglesite	$PbSO_4$	D, E
Barite	$BaSO_4$	B
Gypsum	$CaSO_4\cdot 2H_2O$	D
Goslarite	$ZnSO_4\cdot 7H_2O$	D
Brochantite	$Cu_4(OH)_6SO_4$	D, E
Linarite	$PbCu(OH)_2SO_4$	D
Wolframite	$(Mn,Fe)WO_4$	C
Scheelite	$CaWO_4$	C
Stolzite	$PbWO_4$	D
Raspite	$PbWO_4$	D
Wulfenite	$PbMoO_4$	D

Phosphates, Arsenates and Vanadates

Apatite	$Ca_5(PO_4)_3F$	A, B
Pyromorphite	$Pb_5(PO_4)_3Cl$	D, E
Mimetite	$Pb_5(AsO_4)_3Cl$	D
Vanadinite	$Pb_5(VO_4)_3Cl$	D, E
Scorodite	$FeAsO_4\cdot 2H_2O$	D
Olivenite	$Cu_2(OH)(AsO_4)$	D
Adamite	$Zn_2(OH)(AsO_4)$	D
Erythrite	$Co_3(AsO_4)_2\cdot 8H_2O$	E
Chenevixite	$Cu_2Fe_2(OH)_4(AsO_4)\cdot H_2O$	E

Silicates

Zircon	$ZrSiO_4$	A
Almandine	$Fe_3Al_2Si_3O_{12}$	A
Sphene	$CaTiSiO_5$	A, B
Andalusite	Al_2SiO_5	A
Sillimanite	Al_2SiO_5	A
Staurolite	$Fe_2Al_9Si_4O_{23}(OH)$	A
Chloritoid	$Fe_2Al_4Si_2O_{10}(OH)_4$	A
Zoisite	$Ca_2Al_3Si_3O_{12}(OH)$	B
Clinozoisite	$Ca_2Al_3Si_3O_{12}(OH)$	A, B
Epidote	$Ca_2(Al,Fe)_3Si_3O_{12}(OH)$	A
Allanite	$(Ca,Ce)_2(Al,Fe,Mg)_3Si_3O_{12}(OH)$	B*
Cordierite	$(Mg,Fe)_2Al_4Si_5O_{18}$	A
Hypersthene	$(Mg,Fe)SiO_3$	A
Augite	$Ca(Mg,Fe)Si_2O_6$	A
Tourmaline	$Na(Mg,Fe)_3Al_6(BO_3)_3SiO_{18}(OH)_4$	A, B
Tremolite	$Ca_2Mg_5Si_8O_{22}(OH)_2$	A, B
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$	B
Hornblende	$NaCa_2(Mg,Fe)_5(Si,Al)_8O_{22}(OH)_2$	A, B
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	A, B
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$	A, B
Plagioclase	$(Ca,Na)(Al,Si)_4O_8$	A
Celsian	$BaAl_2Si_2O_8$	A
Hyalophane	$(K,Ba)(Al,Si)_4O_8$	A
Tephroite	$(Mn,Fe)_2SiO_4$	B
Grossular	$Ca_3Al_2Si_3O_{12}$	B
Spessartine	$Mn_3Al_2Si_3O_{12}$	B
Andradite	$Ca_3Fe_2Si_3O_{12}$	B
Vesuvianite	$Ca_{10}Mg_2Al_4Si_9O_{34}(OH)_4$	B
Axinite	$(Ca,Mn,Fe)_3Al_2(BO_3)Si_4O_{12}(OH)$	B
Pyroxmangite	$(Mn,Fe)SiO_3$	B

Rhodonite	$CaMn_4(SiO_3)_5$	B
Bustamite	$(Ca,Mn)_3Si_3O_9$	B
Hedenbergite	$Ca(Fe,Mn)Si_2O_6$	B
Wollastonite	$CaSiO_3$	B
Dannemorite	$Mn_2Fe_5Si_8O_{22}(OH)_2$	B
Pyrosmalite	$(Mn,Fe)_8Si_6O_{15}(OH,Cl)_{10}$	B
Friedelite	$(Mn,Fe)_8Si_6O_{15}(OH,Cl)_{10}$	B
Inesite	$Ca_2Mn_7Si_{10}O_{28}$ $(OH)_2 \cdot 5H_2O$	B
Orthoclase	$KAlSi_3O_8$	B
Apophyllite	$KCa_4(Si_4O_{10})_2F \cdot 8H_2O$	B
Sturtite	Hydrous Mn silicate	B
Ilvaite	$CaFe_3Si_2O_8(OH)$	B
Hemimorphite	$Zn_4(OH)_2Si_2O_7$	D
Kaolinite	$Al_4Si_4O_{10}(OH)_8$	D
Chrysocolla	$Cu_2H_2Si_2O_5(OH)_4$	D
Stilpnomelane	$K(Fe,Mg,Al)_3Si_4O_{10}(OH)_2$	E
Bannisterite	$(K,Na)Mn_5(Si,Al)_6$ $O_{15}(OH)_5 \cdot 2H_2O$ B	B
Chalbazite	$CaAl_2Si_4O_{12} \cdot 6H_2O$	B
Laumontite	$CaAl_2Si_4O_{12} \cdot 4H_2O$	B
Chlorite	$(Mg,Fe,Al)_6(Al,Si)_4$ $O_{10}(OH)_8$	B*
Bementite	$Mn_8Si_6O_{15}(OH)_{10}$	B

duced the great oxidized zone at Broken Hill. Many of the manganese silicates are common to all three deposits. At Långban lead and zinc minerals are accessory, whereas at Franklin zinc is the dominant metal, and lead is accessory. At Franklin the zinc is mostly present as zincite, franklinite, and willemite, minerals unknown from Broken Hill. What these three mines have in common is an extensive list of minerals, and a high concentration of manganese in the gangue. Their ultimate origin may well have been related, but since original deposition (in the Precambrian for all three deposits) their subsequent history of metamorphism and metasomatism has been distinctly different.

The most recent comprehensive account of Broken Hill mineralogy is "The minerals of the Broken Hill district" by L. J. Lawrence, a chapter in *Broken Hill Mines - 1968*, published by the Australian Institute of Mining and Metallurgy. Unfortunately this book has had rather limited circulation and is not readily obtainable. Table 2 is a compilation drawn largely from Dr. Lawrence's work.

The continuing potential of the Broken Hill orebody is illustrated in a press release issued by the North Broken Hill Company on August 28, 1975. An exploration drillhole from the 36 level (1540 meters below the surface) in their mine entered high-grade mineralization at 302 meters and continued therein for a distance of 37.3 meters; assays of these 37.3 meters of mineralization indicate 26.2 percent lead, 21.2 percent zinc, and 459 grams per ton silver.

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AN OCCURRENCE OF MULTIPLE JAPAN-LAW QUARTZ TWINS

by Joseph E. Taggart and Charles Owen Grigsby

New Mexico Bureau of Mines and Mineral Resources
Socorro, New Mexico 87801

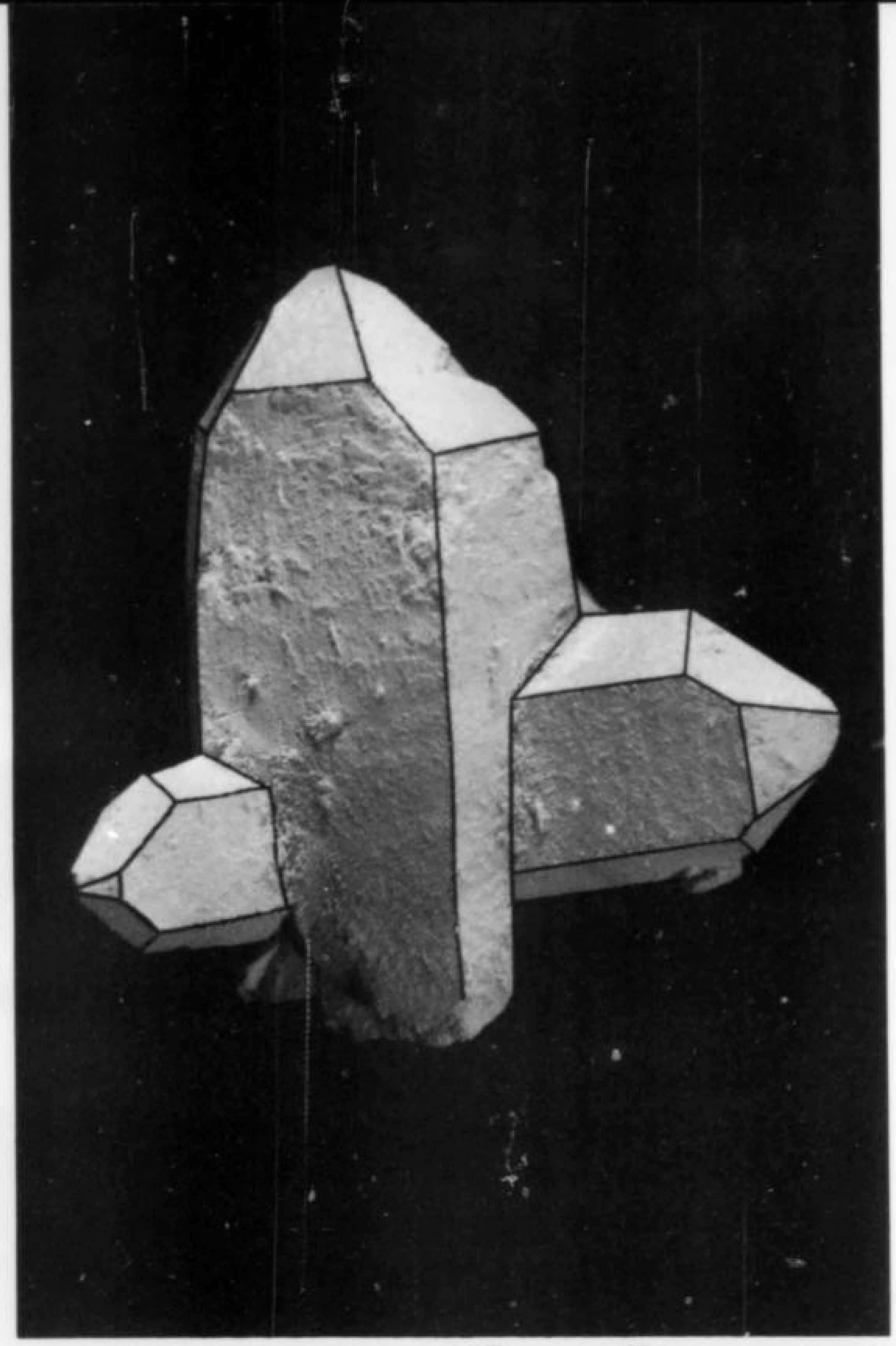

Figure 1. **Japan-law twin on $\{11\bar{2}\bar{2}\}$ and $\{1\bar{2}\bar{1}2\}$ forms. Specimen coated with NH_4Cl.**

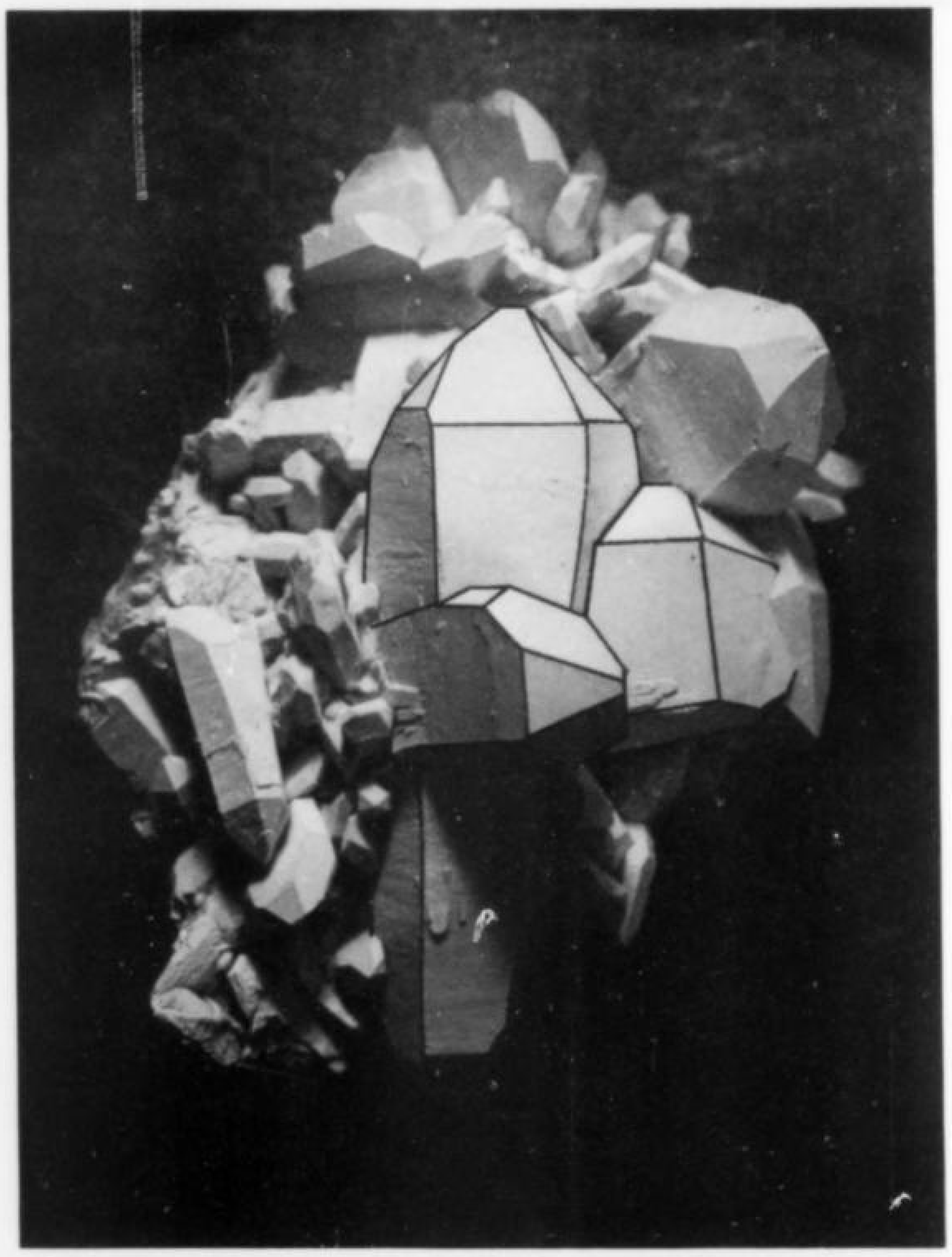

Figure 2. **Japan-law twin on $\{11\bar{2}\bar{2}\}$ and $\{\bar{1}\bar{2}\bar{1}\bar{2}\}$ forms. Specimen coated with NH_4Cl.**

During the summer of 1975 a pocket of Japan-law quartz twins was found at the San Pedro mine near Golden, New Mexico. The remarkable feature of this pocket was the presence of some multiple Japan-law quartz twins up to 3.5 cm (1 3/8 inches) long. Multiple Japan-law quartz twins have been reported in only two other instances—a 5 mm (3/16 inch) specimen from "near the Yankee Boy mine, about six miles easterly from Mayer, Gila County, Arizona" (Bideaux, 1970) and an "8-inch specimen from Brusson, near Verres, Aosta Thal, Pennine Alps, Italy, from the Bosch Collection and now in the Smithsonian Collection" (J. White pers. comm.). The multiple twins from the San Pedro mine are characterized by a large parent crystal of almost equant habit about the long axis with smaller satellite crystals in twinned positions. None of the crystals show forms or natural etching indicative of hand. The twinning relationships are of four types: the first is shown in figure 1 and is a simple repeat of the $\{11\bar{2}2\}$ form around the axis of three fold rotational symmetry (all specimens were temporarily coated with a precipitate of NH_4Cl to create a uniform reflective surface for photography). From this specimen, satellites may be inferred to be twinned on the $\{11\bar{2}2\}$, $\{\bar{2}112\}$, and $\{1\bar{2}12\}$. The second type is that of Bideaux (1970) and is shown in figure 2. This sample shows twinning on the $\{11\bar{2}2\}$ and $\{\bar{1}2\bar{1}2\}$ forms, apparently supporting the theory that satellites may be twinned on any of the repeats of the $\{11\bar{2}2\}$ zone (Kozu, 1952) (that is $\{11\bar{2}2\}$, $\{\bar{1}2\bar{1}2\}$, $\{\bar{2}112\}$, $\{\bar{1}\bar{1}22\}$, $\{1\bar{2}12\}$, $\{2\bar{1}\bar{1}2\}$, $\{11\bar{2}\bar{2}\}$, $\{\bar{1}2\bar{1}\bar{2}\}$, $\{\bar{2}112\}$, $\{\bar{1}\bar{1}2\bar{2}\}$, $\{1\bar{2}1\bar{2}\}$, and $\{2\bar{1}\bar{1}\bar{2}\}$. This premise is further supported by the occurrence of the third

Figure 3. **Japan-law twin on $\{11\bar{2}\bar{2}\}$ and $\{2\bar{1}\bar{1}\bar{2}\}$ forms. Specimen coated with NH_4Cl.**

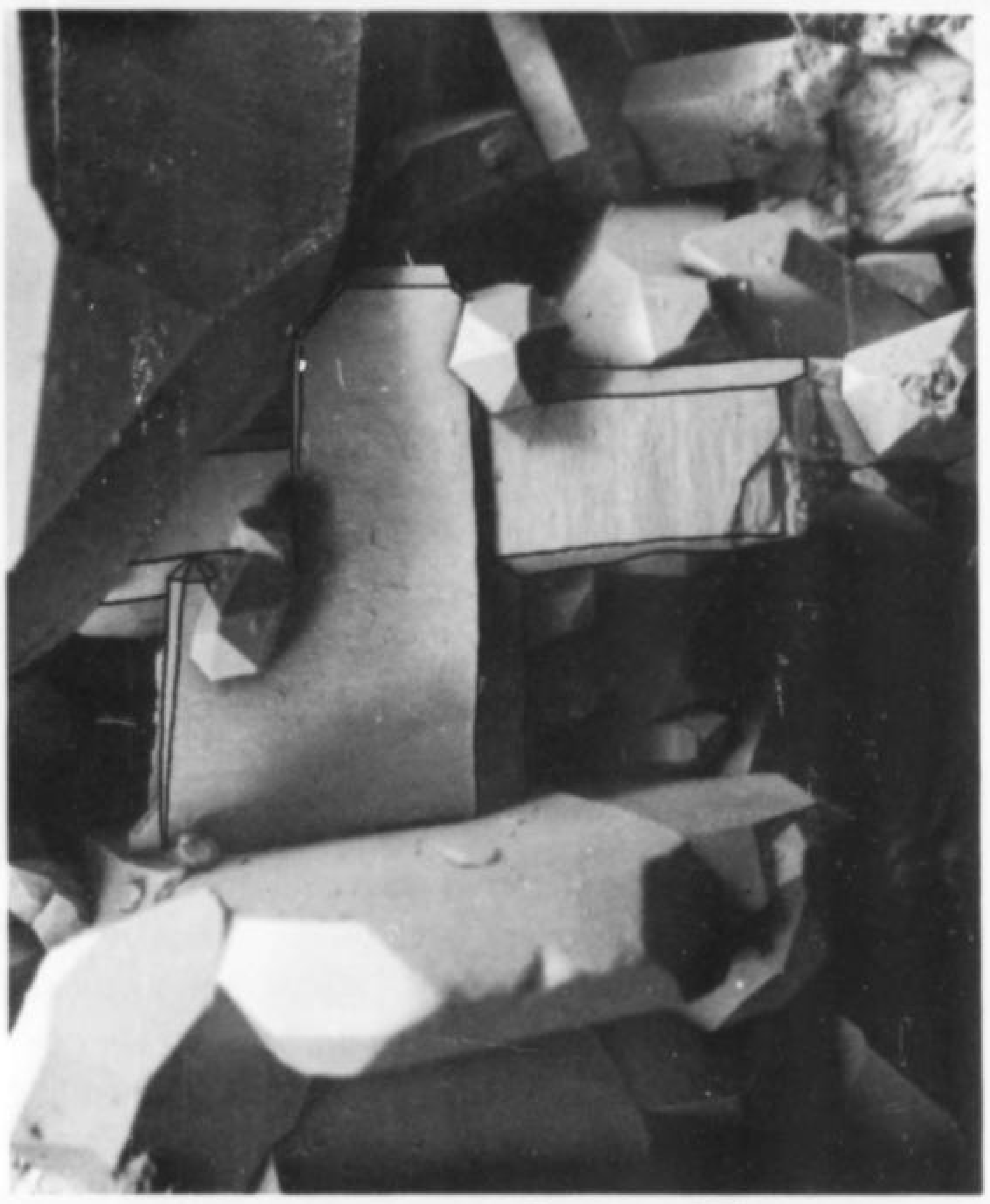

Figure 4. **Japan-law twin on $\{11\bar{2}2\}$ and $\{2\bar{1}\bar{1}\bar{2}\}$ forms. Specimen coated with NH_4Cl.**

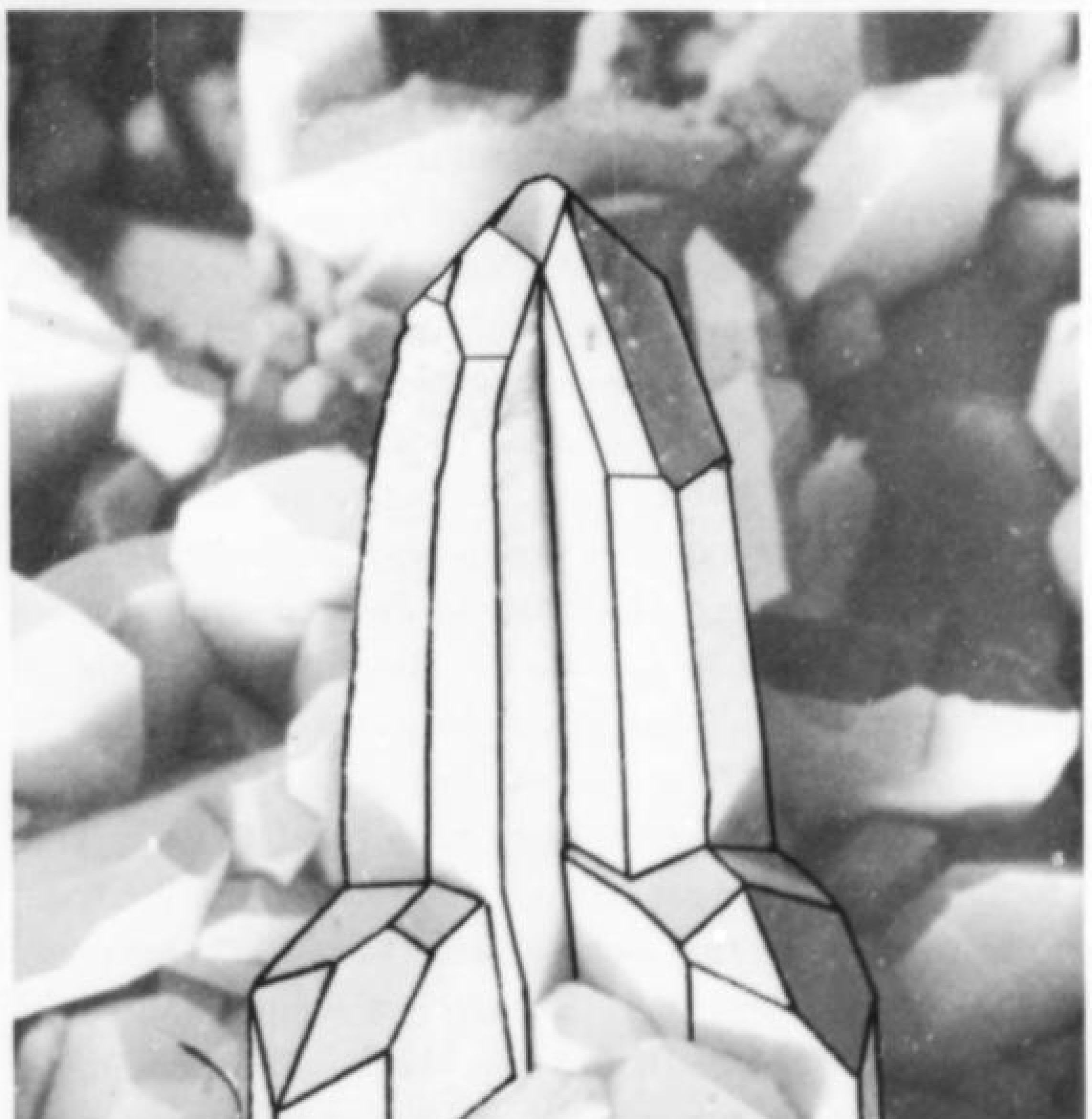

Figure 5. **Combined dauphiné and Japan-law twins. Specimen coated with NH_4Cl.**

type, shown in figure 3, illustrating satellites twinned on $\{11\bar{2}2\}$ and $\{2\bar{1}\bar{1}\bar{2}\}$, and the fourth type, shown in figure 4, illustrating satellites twinned on $\{11\bar{2}2\}$ and $\{\bar{1}\bar{1}2\bar{2}\}$. Apparently a parent crystal has 12 satellite positions, any combination of which may be occupied or vacant.

In addition to the above twin types is a single occurrence of two parent crystals twinned by the Dauphiné law with a satellite crystal twinned to each of the parent crystals by the Japan law (fig. 5).

Japan twins occur at the San Pedro mine in pockets of silicified limestone associated with a skarn formed at the contact of a series of intrusions with the Madera limestone (Pennsylvanian) (Atkinson, 1961). Fluid inclusion studies on the untwinned and Japan-twinned quartz show identical homogenization temperatures (temperature of formation) of 160° to 180° C. In both cases the inclusions consist of two phases: liquid and vapor.

ACKNOWLEDGMENTS

The authors thank Raymond Nanco and Gene Thompson for their assistance in collecting the samples; and Steve Hook for the photography.

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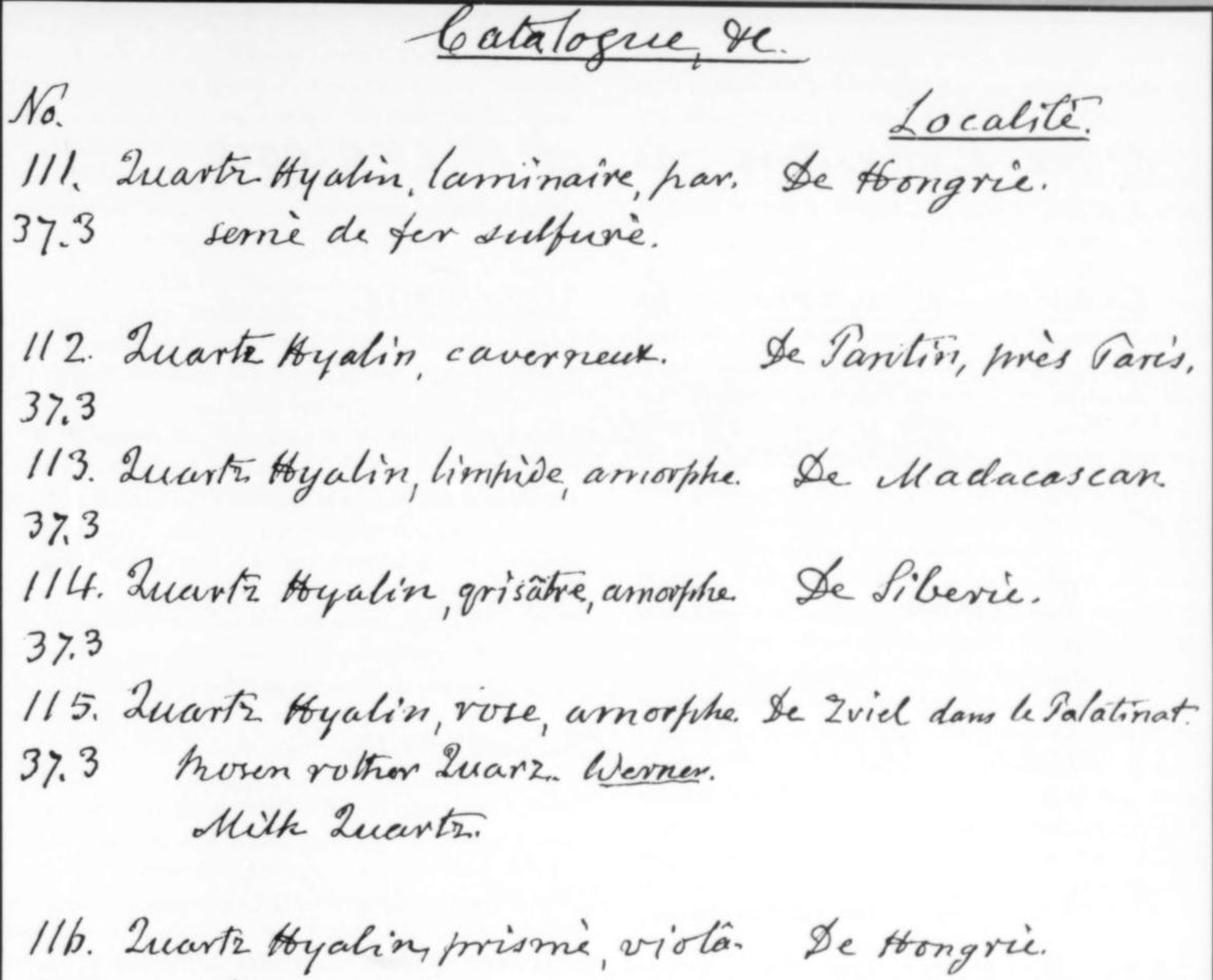
yedlin on micromounting

After the Eastern Federation convention at Portland, Maine, last summer, we went over to Brunswick to visit the mineral collection at Bowdoin College, and to renew acquaintances with an old friend, Ben Burbank, its curator. We'd lived in Maine prior to World War II, were a member of the Maine Mineralogical Society which met at Portland, and were close friends of Burbank, Willis True, Ned Leonard, Jessie Beach, Andy Snyder and Herb Haven, whose collection was willed to Colby College at Waterville. Burbank was a member of the team under Harvard's Palache that found the great pocket at Fisher's Ledge, Topsham, which produced immense herderites, green microlite, "rock candy" etched topaz and beryl, gemmy elbaite, and fine columbite, mangancolumbite, and abite. Other things, too - apatite, lithiophilite, lepidolite, and amblygonite came out, and museums throughout the world benefited from this find. Well, a couple of months ago a package arrived from Burbank, and the accompanying letter stated that he'd just given his personal collection to the college, but that it would make him suffer if he threw these small remants of that find away. "If you can't use 'em," he wrote, "you discard them, but don't tell me about it, so I'll not feel bad." How do you throw out micro crystals of herderite, columbite, microlite, elbaite and topaz? We mounted all of them, and now have a representative suite from that famous locality.

Back to our visit to Bowdoin. We saw - but let Burbank tell it. "We have two collections of particular interest historically. The first is that of James Bowdoin III, which is essentially Haüy material which Bowdoin purchased in 1806. It amounted to 600 specimens and 385 ceramic crystal models. (Need we tell you that the Abbe Haüy was the father of modern crystallography, and published a 5 volume set entitled *Traité de Minéralogie* in 1801, which utilized the crystal models in the atlas?) I have only a small part on display, 1 large and 2 small cabinets. Haüy was professor and curator of minerals at Paris School of Mines, late 1700 to 1822. Thus the collection is primarily of European minerals. The other collection is the personal one of Parker Cleaveland, professor of mineralogy at Bowdoin from 1805 to 1858. It is one of the early American collection of historic interest. We have others, too. That of O.S.C. Smith, who specialized in the minerals of the New England pegmatites, the Marston collection, one of general interest, and many more modern ones. Our space is limited, most are in drawers in my office but I hope to get the important minerals on view for students." Veni, vidi, I was impressed (reverting to first person, singular). Some of the specimens were very fine; some were good. Some were, well, historic. But those crystal models of baked clay were astounding! How was Haüy able to maintain accurate interfacial angles after they'd been in a kiln for hardening? Or were they merely models to illustrate crystal habits to his students? We didn't measure them, nor, in the final analysis, do we care. There they are, evidence of the working of a great mind in the field of mineralogy.

Paul Moore was a speaker at Portland. Subsequent to the meeting he spent a week or so at the Palermo quarry at North Groton, New Hampshire, seeking new elusive phosphate minerals and their paragenesis. Forrest Fogg (foggite) and Bob Whitmore (whitmoreite) now operate the quarry for specimens and collectors. A note from Fogg anent the operation discloses that "--- we charged a dollar last year and found that we fell far short of obtaining enough to purchase insurance, let alone renting equipment for moving tons of rock to make minerals available. We are left with no alternative but to raise our fee this year to two dollars per person, individually or in groups. This summer -1975- should determine our future policy. We do want to operate the mine for the benefit of all collectors." This letter was written April 4th. The temperature today in New Haven, this August 2nd is 90° with 94 percent humidity. Fogg goes on: "There is still a foot of snow at the mine and I am in hopes that the road will be passable by the opening date - May 4th." Our comment - "Where was all this heat last winter and early spring when we needed it?" But the road's been made accessible, the chain across it is no longer there, and minerals in micromount size are coming out.

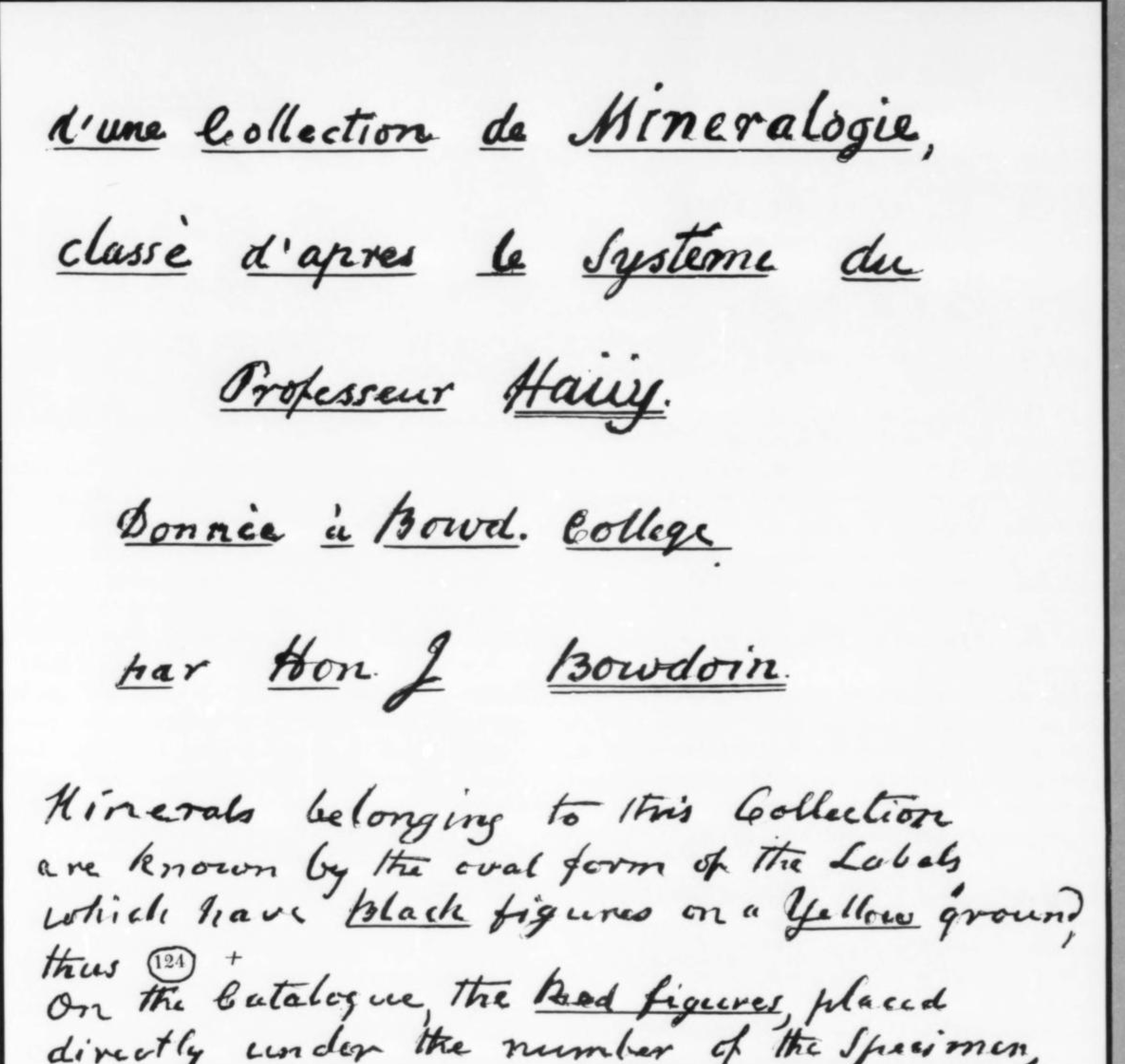
The Micro Mineralogists of the National Capital Area held their fourth spring roundup on April 5th and 6th, 1975 at the Adult Education Center, University of Maryland. It was great. The subject was Canadian minerals, and Hal Steacy and Don Hogarth from above the border were the first and second speakers, with Mike Fleischer of the Geological Survey, and Del Oswald of the Carnegie Museum of Pittsburgh as follow-ups. The weather did everything but earthquake. Snow in Canada, sleet, freezing winds, but the micromounters and speakers arrived to



Catalogue, &c.

No.		Localité.
111. 37.3	Quartz Hyalin, laminaire, par. semé de fer sulfuré.	De Hongrie.
112. 37.3	Quartz Hyalin, caverneux.	De Pantin, près Paris.
113. 37.3	Quartz Hyalin, limpide, amorphe.	De Madacascar.
114. 37.3	Quartz Hyalin, grisâtre, amorphe.	De Siberie.
115. 37.3	Quartz Hyalin, rose, amorphe. Rosen rother Quarz. Werner. Milk Quartz.	De Zviel dans le Palatinat.
116. 37.3	Quartz Hyalin, prismé, violâtre, groupés. Amethyst. Werner.	De Hongrie.
117. 37.3	Quartz Hyalin, prismé, violâtre; cristal isolé.	De Siberie
118. 37.3	Quartz Hyalin, prismé, violet, en cristaux groupés.	De Hongrie
119. 37.3	Quartz Hyalin, violet, amorphe poli.	

Facsimile of Catalog of Haüy's collection of minerals acquired by Bowdoin College, at Brunswick, Maine, in 1806.



d'une Collection de Mineralogie,

classè d'apres le Systéme du

Professeur Haüy.

Donnée à Bowd. College

par Hon. J Bowdoin.

Minerals belonging to this Collection are known by the oval form of the Labels which have Black figures on a Yellow ground, thus (124) +
On the Catalogue, the Red figures, placed directly under the number of the Specimen, indicate the Alcove and Shelf, where the Specimens may be found.

Copy of the original description of Haüy's collection acquired in 1906 by Bowdoin College James Bowdoin, III. Facsimile of Catalog of Hauy's collection of minerals acquired by Bowdoin College, at Brunswick, Maine, in 1806.

carry out their planned programs. Steacy, scheduled for the first talk couldn't get off the ground in Ottawa. Hogarth, taking a later plane just made it in time to substitute for Steacy, who was able to come in for the afternoon session. Del Oswald made it over the mountains from Pittsburgh before the snow, and we were almost blown off the bridge across the Susquehanna. But the facilities were great, the talks were fine, the minerals abundant and the ideas were flowing. Hogarth discussed the "Micro and Macro Minerals from the Gatineau Region of Quebec," Steacy discoursed on "Classic Mineral Collecting Localities of Ontario and Quebec", Fleischer told of "Mineral Names and Some Mineral Namers" (He really knows about this subject, having been for years the chairman of the Commission on New Minerals and Mineral Names, of the International Mineralogical Association), and Oswald came up with "Minerals I have Met in Quebec".

April 3rd and 4th, 1976, is the scheduled date for the Fifth Spring Round-up. Same place, with the club taking most of the facilities and rooms of the Center, and the promise of a superb meeting. For reservations: Ruth C. Wertz, 9707 Sutherland Road, Silver Spring, Maryland, 20901.

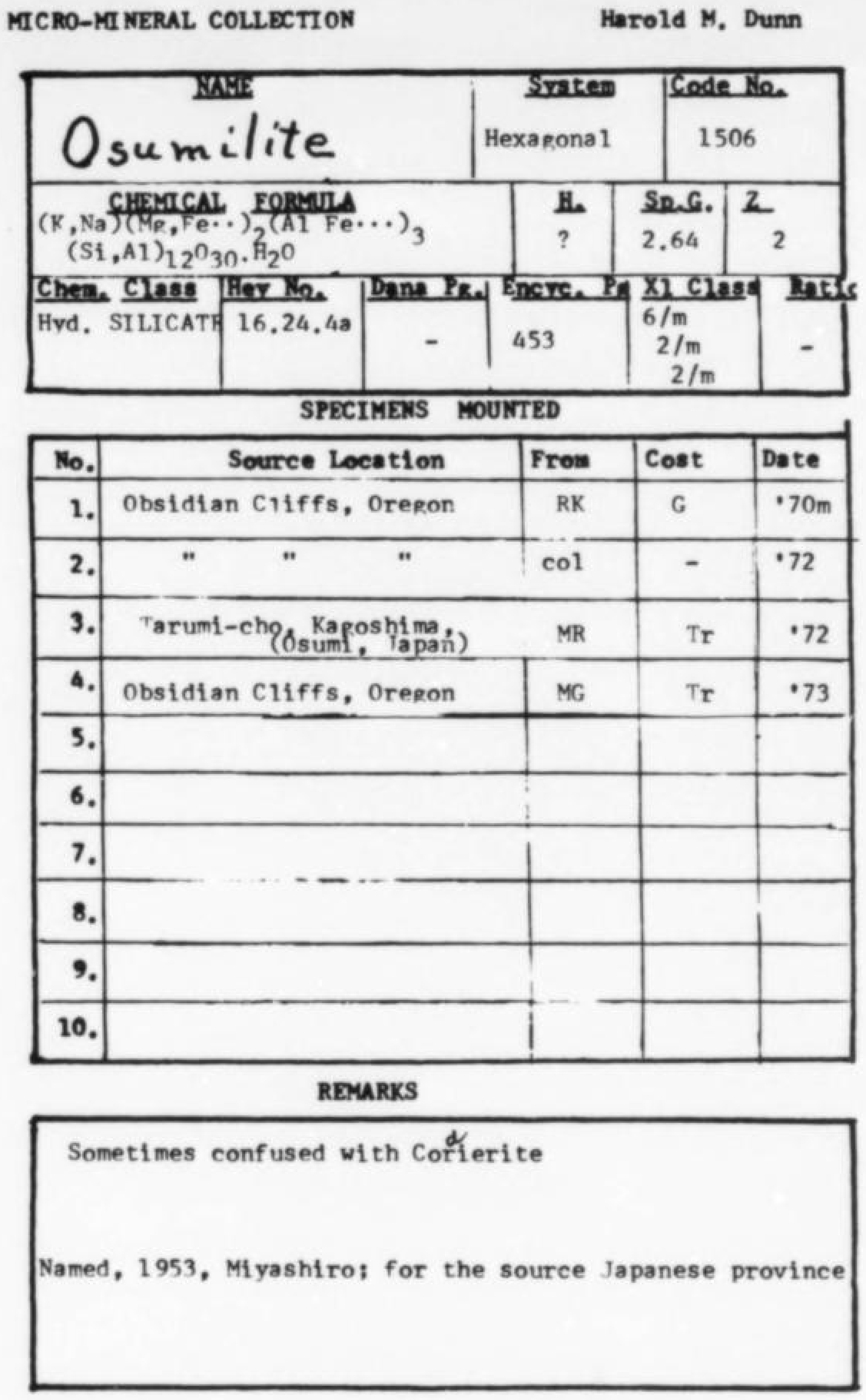
On November 30, 1948, Charles R. Toothaker, curator of the Philadelphia Commercial Museum in Pennsylvania, sent us a letter. Going through some old files brought the missive to light, and since it pertains to micromounting we thought to reprint part of it. Now Toothaker was a contemporary of Fiss, Rakestraw, Brinton, Wills, Boyle and the rest of the early micromount collectors, and his writing to us created a link with those old-time collectors. We'd been doing a column in *Rocks and Minerals* on the subject, and had described a universal stage for holding mounts. Dr. Toothaker wrote: "I have read your article in *Rocks and Minerals*......your universal stage is excellent......I want to add one thing that I think is often helpful. I am looking at a micromount and I want to show it to someone else. Of course, a revolving table is a convenient thing, but not everyone has one. (Note. We have the one from Philadelphia that he missed out on.) I took two pieces of hard wood, 7/8 inches thick and about 2 feet in diameter, more or less. I bored a hole in the center of both and put in the holes a bolt with the head and the nut countersunk. On the lower side of the bottom board I cemented a piece of felt... to prevent scratching. On the lower side of the upper board I drove in 4 'domes of silence', the sort of things that you put on the bottom of the legs of furniture so as to move them easily. I put a good coating of floor wax on the upper surface of the lower board. I set my microscope on this. The upper spins easily. Now, if I'm looking at a micromount, my friend sets alongside me and I just turn the upper board and we can both look at the specimen without either of us leaving our chairs."

John Grenzig, old time dealer in Brooklyn, New York, used a similar device. A half inch piece of plywood, tapered to look like a surf board, and two feet long by a foot wide at one end, had two rubber roller skate wheels attached to the wide end, at right angles to the "c" axis of the board. At the narrow end he affixed a bearing, consisting of a rubber disc, looking like a hockey puck, on which the board rotated. Grenzig's dining room table was a pedestal type, round, about 54 inches in diameter. The bearing was placed at the center of the table, the 'scope atop the board, and the whole spun on the skate wheels so that anyone could, in turn, observe.

For years we've been reminding that the purchase of a good stereobinocular microscope was a sound investment, and the cost, when spread over the number of years that such instrument is normally used by a devout collector, was trifling, about a dollar a week. And that most of this was recovered when the 'scope was sold, used magnifiers being depreciated so little. But the microscope is useless unless it is used in conjunction with a good light, a real good one. If you can't see something, no amount of magnification will enhance its appearance, and unless you can see it, the whole point of micromounting is lost. Now these lights are expensive; those put out by the makers of the 'scopes can run to over a hundred dollars. Such lights as the "Tensor" and their copies are not adequate. Sure, things look pretty fair, if they're not too small, or if they are contrasted by the background of the matrix. But once you've seen a specimen properly lighted, you're never satisfied with anything less. And you shouldn't be. The best of such lights operate from a transformer, and use General Electric 12 volt bulbs #1493, which are pretty costly, unless purchased in lots of 10 at a wholesale level. These lights can be focussed from a wide beam to a pinpoint of light, suiting any purpose from viewing to photography. Currently we have three such; two American Optical and one de Haas. We began years ago with a regular goosenecked desk lamp, keeping it close to the specimen, barely out of the line of sight of the microscope. Worked fine, except between the months of April and October, when its heat fogged everything, including our eyesight. Add, then, to the cost of your basic equipment, the additional price of a top-flight light source.

A number of people have asked about cataloguing their collections. This is of paramount importance, for records of specimens, and assemblages of specimens, giving all pertinent data not available in the literature, should be recorded, and number-matched to the actual minerals. For years we've recommended that a label be cemented to the specimen itself, to the side on which the mineral rests in the cabinet. The most important information to be on this label is the locality, for all else can be determined at any time. In lieu of this label a number can be affixed - a smear of white or colored lacquer, drying in a few minutes, and then a number in India ink, keyed to a full description on a card or notebook. Separation of the specimen and index card too often occurs, and when the collection is disseminated by heirs or assigns, the data are lost. Not too long ago a famous auctioneer in England disposed of a famous collection, piece by piece. The minerals had been catalogued in a notebook. At the end of the auction the catalogue was sold individually. And why not? It had no further use as such, and was an antique, rather than a scientific index.

We include herewith 2 index records. One is what we use - a 3 X 5 inch card with space that we feel is important about each specimen. A computer type series of entries on the bottom gives history. (We copied this from one of John Sinkankas' indices.) Fine for cabinet minerals, where



MICRO-MINERAL COLLECTION Harold M. Dunn

NAME	System	Code No.
Osumilite	Hexagonal	1506

CHEMICAL FORMULA	H.	Sp.G.	Z
(K,Na)(Mg,Fe··)$_2$(Al Fe···)$_3$ (Si,Al)$_{12}$O$_{30}$·H$_2$O	?	2.64	2

Chem. Class	Hey No.	Dana Pg.	Encyc. Pg	Xl Class	Ratic
Hyd. SILICATE	16.24.4a	-	453	6/m 2/m 2/m	-

SPECIMENS MOUNTED

No.	Source Location	From	Cost	Date
1.	Obsidian Cliffs, Oregon	RK	G	'70m
2.	" " "	col	-	'72
3.	Tarumi-cho, Kagoshima, (Osumi, Japan)	MR	Tr	'72
4.	Obsidian Cliffs, Oregon	MG	Tr	'73
5.				
6.				
7.				
8.				
9.				
10.				

REMARKS

Sometimes confused with Cordierite

Named, 1953, Miyashiro; for the source Japanese province

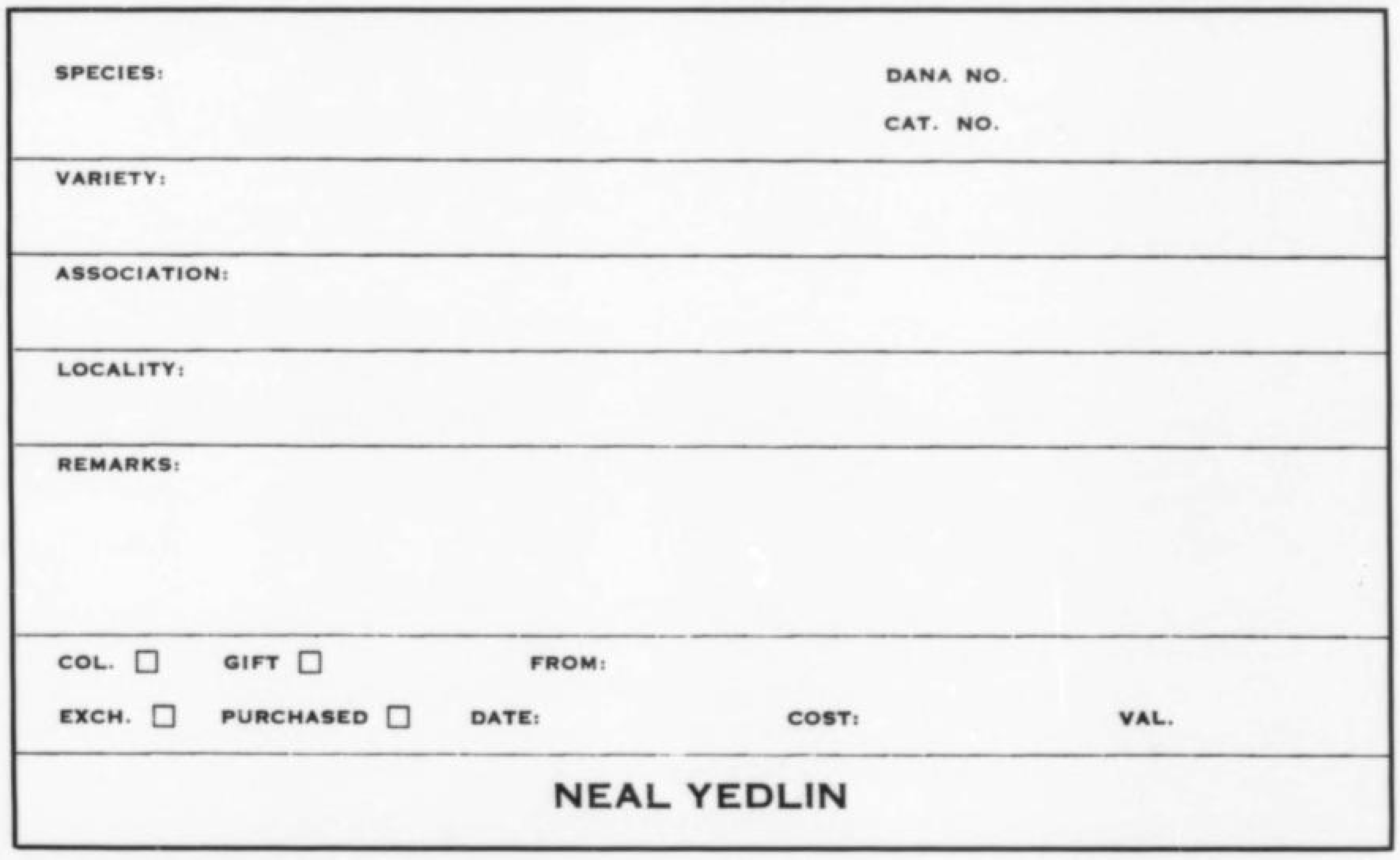
you have but one or two of each, but an endless chore to maintain such a file for 15,000 or so micromounts, particularly where you may have a hundred of a single species. Harold M. Dunn, Mohawk Star Route, Box 5, Springfield, Oregon, submits another. This is a page from a loose-leaf notebook and has space for 10 entries. His data are rather all-encompassing, and perhaps overly complete. He uses color to group the chemical classes. We do too, but for other reasons. Our specimens and cards are in alphabetical order, and we can, at a glance, pull cards from the file for certain localities, radioactives, etc. The labels on our micromounts are so colored, and where we want to check all specimens from, say, the Palermo mine, we need only go through the collection and remove brown labeled boxes. Dunn credits his ideas to Bob and Mary Hillsdon, of Richmond, British Columbia, who introduced this type of indexing to members of the North-West Micro-Mineral Study Group.

The postman has just brought us a price list from Mineralogical Research Company, 14770 Whipple Court, San Jose, California 95127. Sharon and Eugene Cisneros have outdone themselves, For the past few months they've been serving up Bolivian sulfosalts, bismuth minerals, vauxite and paravauxite, and a host of others. Now they've come up with boleite, pseudoboleite, and cumengite, from the famous Baja California locale. We'd heard that Pala Properties was exploring this long lost locality, and they must have hit it again. Matrices of these specimens are not gypsum, as was previously described, but anglesite and phosgenite. You should get a suite. You should get a price list, too. Investment - 2 dimes for postage.

We've received reports from Horst Windisch's South African Micromount Society: from the *Guilder*, the Newsletter of the Golden Reef Mineral Guild, of Johannesburg, South Africa: a number of price lists of established and new mineral dealers - patience, we'll get to you anon - and anon.

Meanwhile, buy and use a good mineral book, and be certain to put a new bulb in your light before photographing through your microscope.

Sample of Neal Yedlin's 3 x 5 inch index card.



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NEAL YEDLIN

to the Editor

VIRGEM DA LAPA

Dear Sir:

Some comments on the note I read under the title "Topaz etc", in the What's New in Minerals column. The "garimpeiros" were mining the Virgem da Lapa pegmatites with explosives, without being legally authorized for blasting. Most of the Minas Gerais pegmatites are deeply weathered, not requiring the extensive use of blasting. The Virgem da Lapa pegmatites are unaltered ones. The Brazilian government closed the mines for a while, after a serious accident with explosives, which killed three "garimpeiros". The mining started again soon after miners were allowed to blast.

Besides the minerals you mentioned, topaz, elbaite, lepidolite and albite, there also occurs microlite in sharp crystals, exceptional size for the mineral, up to 3 cm on an edge.

There are three mines in operation in Virgem da Lapa: "Xandra", "Limoeiro" and "Morro Redondo". They are located 25 miles from Virgem da Lapa on a bad road. They were found two and a half years ago, when they started producing beryl on feldspathic matrix. They are all underground mines. There is an altered layer from 5 to 15 meters thick. After mining the altered layer, they are obliged to blast the unaltered one. That is why it is so difficult to find undamaged topaz crystals. By the end of the 1975 dry season (late September), there were approximately 400 miners at the Xandra mine, 300 at the Limoeiro and 150 at the Morro Redondo. Most of the blue topaz on the market was found at the Xandra and Limoeiro mines. Morro Redondo produces mainly elbaite, usually gemmy, green and bluish color. During the rainy season production is very small, sometimes nothing at all. This is due not only to the difficulty of mining but also because most of the "garimpeiros" return to agriculture and become planters.

Alvaro Lucio
Belo Horizonte, Brazil

LOYAL SUPPORTERS

Dear Sir:

The executive board of the Baltimore Mineral Society, a Section of the Maryland Academy of Sciences, has authorized a contribution of one hundred and fifty dollars ($150.00) to The Mineralogical Record, Inc. in support of the periodical publication, *The Mineralogical Record*.

This contribution is being made in lieu of personal honoraria for the principal speakers at the 19th Annual Micromount Symposium, sponsored by the Baltimore Mineral Society, and held in Baltimore, Maryland, on September 26, 27, and 28, 1975: Dr. Joel

PLEASE NOTE

The Tucson Gem and Mineral Society is currently preparing for release at their Feb. 1976 show the first of a planned series of special papers for collectors.

Special Paper #1 will be a previously unpublished "Minerals of Llallagua, Bolivia" written by Dr. Mark C. Bandy in 1944 when he was Mineralogist for the Patino group in Bolivia. The Paper will be approximately 80 pages with black and white photos of some of the more noted minerals from the Bandy collection.

Ah, mon cherie. Come wiz me to ze Caz Bar for an evening of l'amour, **LE MONDE ET LES MINERAUX** — a french bimonthly journal for mineral collectors. Subscription rate: $15 per year. Make checks payable to: Mineralogical Record, P.O. Box 783F, Bowie, Maryland.

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E. Arem, author; Mr. Paul E. Desautels, curator, Division of Mineralogy, Smithsonian Institution; Dr. Paul B. Moore, professor, Department of Geophysical Sciences, University of Chicago; and Mr. Louis Perloff, photomicrographer.

Similar annual contributions have been made since 1973, and it is the intention of the Baltimore Mineral Society ot maintain the precedent so that all of the participants in future symposia will be able to collectively assist in the support of a worthwhile periodical of proven educational value.

William Kennedy
Secretary-Treasurer
Baltimore, Maryland

HELP WANTED

Dear Sir:

Can someone help? A new mineral has been found here in Michigan. What is the process and procedure that should be taken to be sure its founders get the proper credit and right to name it? There is some work being done but it has taken too long. As you know, another new mineral... was found in Michigan and named after a wellknown publisher. I haven't heard who got the credit but this mineral was really found over four years ago and proper credit wasn't received by the young lad who found it.

Don Wharff
Rochester, Michigan

Since a proper description of a new mineral requires the application of elaborate equipment, most such descriptions emanate from professional mineralogists who have access to such equipment and the skills to use it. It may be that there have been failures to adequately acknowledge the discoverers, but in my experience these failures have been rare and have usually been due to a misunderstanding rather than a deliberate attempt to misrepresent the discovery. While the describer is generally granted the right to name the mineral whatever he or she cares to, most will certainly bow to the reasonable wishes of the person who supplied the material. If you feel you have a new mineral, you are at liberty to barter with the mineralogists of your choice until you find one who will name this mineral in accord with your wishes. Of course, you may not find one who will agree with your choice of a name. If you do, however, please be patient because thorough descriptions often take a very long time, several years is not unusual. Ed.

NEW SOCIETY FORMED

Dear Sir:

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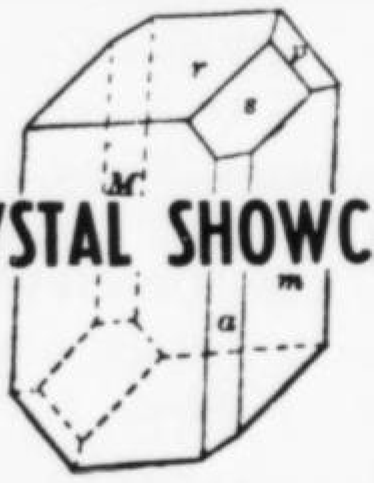

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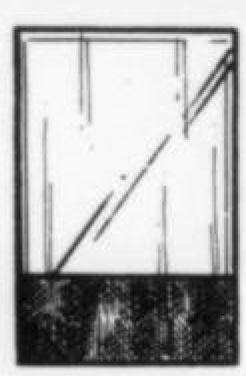

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an Australia-wide membership, should interest grow to a point that similar Societies form in other states, as is happening in Victoria, these could be coordinated by a federal body such as the "Federation of Australian Mineralogical Societies", in keeping with the organization in the United States. Following is a list of appointed positions and committee members:

President - Mr. C. Parkinson
Vice President - Mr. S. Pecover
Secretary - Mr. R. Depledge
Treasurer - Mrs. M. Parkinson
Publicity Officer - Mr. R. Bliss
Committee Members - Mr. A. Chapman, Mr. Bert Gardner, Mr. Maxwell Hudson, Mr. Neville Irvine, and Mr. S. Wright

Maxwell John Hudson
New South Wales, Australia

The editor congratulates The Mineral Society of New South Wales in their founding. We look forward to many contributions from this new group, particularly since it is endowed with a wealth of ardent and talented collectors. Ed.

CHANGES IN *MR*

Dear Sir:

In response to Mr. Kenneth Walling's letter in *MR*, Vol. 6 #3, I would be personally appalled if *MR* did comply with his request.

To my knowledge *MR* was started because a mineral magazine was needed which would serve those collectors who were above the level of the less informative magazines but not quite to the level of the *American Mineralogist*.

If people wish to do a substantial amount of trading, I recommend that these people advertise in other magazines. The idea of occassionally publishing one's letter of request for some mineral materials would be better both for *MR* and for its subscribers.

If *MR* MUST have an exchange column, then I would hope that the editor would carefully scrutinize the letters and weed out those requests which appear to be for the "run of the mill" materials, unless of course these materials are being used in scientific study areas. The "run of the mill" materials belong in a common magazine, not *MR*.

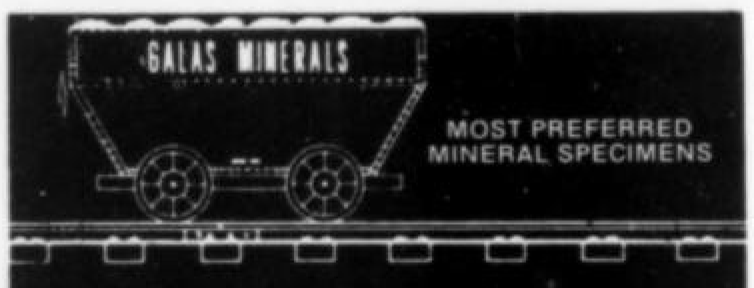
I hope that other subscribers will let you know what their feelings are towards this matter.

Bob Stewart
Derby, Connecticut

ROOM-GATERS

Dear Sir:

The reproduction of William Sanborns' letter as a guest editorial (MR July/August 1975) about the 1975



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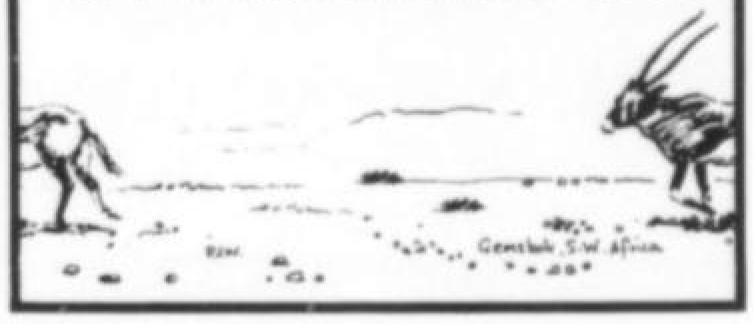

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Tucson show was of great interest to those of us who were unable to cover the entire show, and I am sure to the many who were unable to attend the show at all. I would like to add one short comment to the description given which I feel will be of value to those who plan to attend the 1976 show. The Sands Hotel was not mentioned in the list of locations housing motel/hotel room dealers. The Sands, located across the street from the Desert Inn, housed several mineral dealers displaying amounts of material in a sufficient quantity and quality as to draw a respectable crowd. It was not generally known that dealers were occupying this hotel, therefore, the crowds were smaller, dealers hungrier, and deals seemed faster and more reasonable. This year the Sands will house a larger number of dealers both domestic and foreign, with both minerals and fossils. A group has been organized with a view to filling all first floor rooms with an assortment of well known dealers. I am informed that reservation for 1976 space is brisk with only a few rooms remaining, which should insure the successful addition of this new location to the growing list of "unofficial show" locations, and bring even more buyers and sellers to the Tucson Affair.

I can't resist adding one last comment, passed on to me at Tucson by Russ Filer of Filers Minerals. Most shows have "tail-gaters" but Tucson has "Room-gaters" and "Bed-gaters".

Tom Palmer
Crystal Cavern Minerals
Livermore, California

MORE ON "TRAPPED"

Dear Sir:

In June I was attending one of the leading mineral shows in New England and I was astounded at what I overheard as one collector was talking to one of the dealers.

The collector who was also a judge at the same show had just purchased a large quantity of specimens from the dealer. The collector asked the dealer to please show him exactly what minerals were what on the specimens!

If a person of this caliber was asked to be a judge of minerals, and I might say that the exhibits were very good; then how can one effectively judge mineral exhibits if his knowledge of minerals is so narrow?

If there are to be judges; then the people who host the show should definitely know the competency of those people who are asked to be judges before they completely shove their feet into their mouths and further develop poor feelings with those collectors who are the exhibitors.

Name withheld upon request.

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Dear Sir:

John White's editorial "Trapped" was refreshingly candid but viewed only one side of a two sided dilemma. Mental deliberations by judges regarding competitive specimens that lack aesthetic appeal are extremely difficult and often frustrating. No mention is made of these same deliberations, experienced by an exhibitor, while choosing specimens to be included in his case for competition.

Judges are armed with assurance that their decisions will be backed by Show and Federation officialdom. Whether or not all agree, it would take a gross blunder to create an atmosphere where all would not act in concert. The exhibitor's judgement regarding what specimens he deems worthy of representing him in competition is strictly an individual matter. Once he has placed his specimens in the case, he sinks or swims on the merits of his personal judgement. Here lies the other side of the dilemma.

The ritual of selecting specimens to be exhibited varies from collector to collector, but few can say they have never had to make the same choice Mr. White did. Assuming all specimens are of exceptional quality, what does one eliminate. Invariably, the axe falls on the less showy, less aesthetic specimens. This judgement is influenced by many factors. However, one of the prime factors has been created by the "glue" that holds the competition together...the Federation Rules. By creating a category that personifies aesthetics (Showmanship), the rules have established a built-in criteria that cannot be ignored. Granted, the rules specifically discuss showmanship with regards to overall appearance rather than specific items, yet can anyone truly believe one can keep from considering the parts while creating the whole? It is impossible!

What can be done, then, to eliminate this frustration. Several approaches can be cited. Eliminate the showmanship category entirely. Allow the competitor the "luxury" of choosing the very best specimens in his collection, regardless of visual appeal, and placing them before the critical eye of the judge, to be scored on quality merits only. Scratch label points as well, because this category is, in fact, nothing more than an appendage of showmanship, having *nothing* to do with quality.

Or clearly define showmanship so as to include commentary on overall case as well as individual specimen appearance. A recent exhibitor's case worthy of mention housed an excep-

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tional array of Franklin, New Jersey, material. The specimens were outstanding and received a well earned "blue ribbon, best in show" award, which did honors both to the exhibitor and the judge. Both had the daring to evaluate *quality* as the major factor in competition. And, as anyone familiar with Franklin material well knows, there are many specimens from this locale that come as close to aesthetic marvels as lumps of coal. Shouldn't we seriously consider the possibility that this exceptional collection could just as easily have scored much lower because of its lack of eye appeal? It could easily have happened.

Coordination between judges is absolutely essential if this dilemma is to be solved. Yet this coordination is impossible unless more stringent rules and guidelines are established by the Federation. Once this is accomplished, the exhibitor, given the lead by his peers, will be better able to prepare his case for competition. The mental calisthenics regarding specimen selection will still be there, but one major obstacle will have been removed, and with it, frustration on both sides of the fence.

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ACCURATE LOCALITY DATA

Dear Sir:

As David Jensen very properly emphasized, the determination of the actual source of a particular specimen or of the location of abandoned settlements can be a major undertaking. Old, largely discontinued, topographic maps show some towns that no longer exist or have changed names, but finding copies of them is itself a major problem. This source, of course, is of no help on the occasions when the true locality is in a different state or continent from the locality given.

To belabor one of Jensen's examples — the famous Turkish meerschaum district — there are explanations for some of the spellings of the town name. Before the mid 1920's Turkish was written in the rather unsatisfactory Arabic alphabet. Then an alphabet was adopted that phonetically serves the language. "Eskishehir" is a good phonetic transliteration into English and "Eskischehir" a comparable transliteration into German. Both presumably date from Ottoman times. "Eskişehir" as Jensen points out, is the present Turkish spelling. The diacritical mark gives "ş" the "sh" sound of English, thus is very impor-

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tant as "s" in Turkish sounds the same as "s" in English. "Eskisehir" therefore is a misspelling. It probably results from the unfamiliarity of English-speaking people with extra squiggles that must be added separately to the main body of a letter, as in the dotting of "i's" and "j's" and crossing "t's", which many of us neglect anyway. In this manner Eskişehir is misspelled in Jensen's list. In Turkish, a dotted "i" is a different letter from an undotted "i", whether upper case or lower case. This distinction is hard to make with English typewriters. The other spellings in Jensen's list probably came into being when somebody goofed.

The name "Eskişehir" incidentally is a single word compounded from "Eski" meaning old and "şehir", meaning town.

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TOPAZ, Baldface Mt., New Hampshire. Very fine loose term. xl. 1-1/2 x 1-1/2 x 1-1/4	90.00
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NEPTUNITE, San Benito Co., Calif. Rare doubly term. xl., 1-1/8 x 1/4 x 1/4 on matrix. 3 x 2 x 1	90.00
AMETHYST, Upper Providence Twnshp., Penna. Unusual group of flattened term. xls. Good color. 3 x 3 x 1	35.00
BRAZILIANITE, Smith Mine, Newport, N.H. Unusual xld. mass. 1 x 5/8 x 1/2	25.00
PHENAKITE, Mt. Antero, Colo. Well xld. on matrix. Old Arthur Montgomery label. 2-1/2 x 2 x 1-1/4	70.00
FLUORITE & GALENA, Alston Moor, Cumberland, England. Compound purple xl. with attached Galena, etc. From Peter Zodac Coll. 2 x 2 x 2	18.50
SPHALERITE, Foxdale Mine, Isle of Man. Very well xld. with well xld. Chalcopyrite. 5 x 3-1/2 x 2	75.00
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